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DIRECTORY
VOL. I.

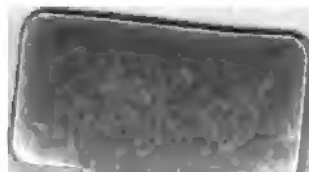


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THE
AUSTRALIA DIRECTORY.

VOLUME I.

SOUTH AND EAST COASTS, BASS STRAIT,
AND TASMANIA.

BEING CHIEFLY THE RESULT OF VARIOUS SURVEYS MADE BY ORDER OF THE
LORDS COMMISSIONERS OF THE ADMIRALTY.

COMPILED BY
CAPTAIN CHARLES B. YULE, R.N.

SIXTH EDITION.



PUBLISHED BY ORDER OF THE LORDS COMMISSIONERS OF THE ADMIRALTY.

LONDON:
PRINTED FOR THE HYDROGRAPHIC OFFICE, ADMIRALTY;
AND SOLD BY

J. D. POTTER, *Agent for Admiralty Charts*,
31 POULTRY, AND 11 KING STREET, TOWER HILL.

1868.

Price 9s.

14861.

20126. d. 91

ADVERTISEMENT.

THE sources from whence the early editions of this volume of the Australia Directory were derived, namely, from Captain Flinders' original survey of the coast, and the subsequent examination of various parts of it by Captains Sir J. J. G. Bremer, P. P. King, Owen Stanley, J. L. Stokes, F. P. Blackwood, J. C. Wickham, C. B. Yule, T. Lipson, and J. S. Roe, of the Royal Navy; also, from the published voyages of the French navigators D'Entrecasteaux and Freycinet, the Remark Books of several of Her Majesty's ships, as well as the reports of Lieutenant Jeffreys; the whole comprised between the years 1793 and 1853, have equally furnished material in the compilation of the present edition.

To these reliable authorities have been added the result of various detached surveys and examinations undertaken by the Imperial and Colonial Governments, extending from King George Sound to Sydney, New South Wales, subsequently made by Captain H. M. Denham, Commanders Ross, Cox, and Hutchison, as also by the intelligent harbour authorities of the several provinces extending to 1865, and the whole has been compiled by Captain C. B. Yule, R.N.

Notwithstanding that the various surveys undertaken on the extensive line of coast herein described, have been carefully executed, and all known authorities have been consulted with respect to other parts less known; yet, as between Capes Leeuwin and Otway especially, and also on the western coasts of Tasmania, much remains to be done, it must necessarily render this work incomplete, and doubtless frequent occasion for revision and amendment will present itself.

Officers, both of the Royal and Mercantile Navy, are therefore requested to transmit to the Secretary of the Admiralty a notice of any errors or omissions they may discover in this work, with a view to its improvement for the benefit of the mariner.

Hydrographic Office, Admiralty, London.
January, 1868.

G. H. R.

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**IN THIS WORK THE BEARINGS ARE ALL MAGNETIC,
EXCEPT WHERE MARKED AS TRUE.**

**THE DISTANCES ARE EXPRESSED IN SEA MILES OF
60 TO A DEGREE OF LATITUDE.**

**A CABLE'S LENGTH IS THE TENTH PART OF A MILE, OR 101.26
FATHOMS, BUT ASSUMED TO BE EQUAL TO 100 FATHOMS.**

AUSTRALIA DIRECTORY.

VOL. I.

SOUTH AND EAST COASTS, BASS STRAIT, AND TASMANIA.

INTRODUCTION.

GENERAL REMARKS ON THE ROUTE BETWEEN CAPE OF GOOD HOPE AND AUSTRALIA.

AFTER rounding the Cape of Good Hope, vessels bound to the south coast of Australia should run down their longitude on or about the parallel of 39° S., where the winds blow almost constantly from some western point, and seldom with more strength than will admit of carrying sail.* In a higher latitude the weather is frequently more boisterous and stormy,

* Although the parallel here assigned of 39° S., as being that where ships may safely run down their longitude, has been objected to by some writers on the ground that of late years many successful passages have been made in much higher latitudes, some even attaining the 55th parallel for the southern point of their great circle or composite route :—still, it has been deemed desirable to retain the directions given in former editions of this work, placing before the navigator the grounds for this decision.

It is true that the distance from the meridian of the Cape of Good Hope to Bass Strait, or the south coast of Tasmania, is diminished greatly as every succeeding higher parallel of latitude is adopted. For example, the 40th parallel has an advantage over the 38th parallel of 380 miles, or nearly two days sailing ; and again the 45th parallel has an advantage over the 40th to the extent of 650 miles, the 50th over the 45th of 480 miles ; and so far, the higher the latitude of the great circle or composite route adopted the more advantageous is the route in point of distance. But the disadvantages attending the selection of any high parallel should be clearly understood by the seaman, and more especially as regards a passenger ship, a small or ill-found vessel, or one deeply laden.

Maury, in advocating the higher parallels of latitude, says :—“ In recommending this route, which differs so widely from the favourite route of the Admiralty, I do it, not because it is an approach to the great circle route, but because the winds and the sea and the distance are all such as to make this route the quickest ;” and again, “ The winds to the North of the 40th parallel of south latitude are much less favourable for Australia than they are to the South of that parallel.”

The evidence in favour of these opinions as to the winds and seas being more favourable South of 40° appears however by no means conclusive ; many experienced navigators are of opinion that North of 40° the steadiness and comparative moderate strength of the winds, combined with the smoother seas and more genial climate, compensate by comfort and security the time presumed to be saved by the shorter route made in the tempestuous gales, the sudden, violent, and fitful shifts of wind, accompanied with hail

and sudden changes of wind, with squally wet weather, are almost constantly to be expected; especially in the winter season, and after passing the islands of St. Paul and Amsterdam. Islands of ice have also been encountered in those regions, as was almost fatally proved by H.M.S. *Guardian*, striking against one in latitude 46° or 47° S., and nearly foundering, in the beginning of summer.*

ST PAUL and AMSTERDAM ISLANDS.—By sighting the islands of St. Paul or Amsterdam the error of the chronometers may be corrected, if considered necessary, before approaching the coast of Australia. In clear weather, they may be seen from a ship's deck at the distance of 50 or 60 miles.

St. Paul, the southern island, has an extinct crater on its east side, forming a remarkable circular basin, which communicates with the sea. To the eastward of the crater entrance, temporary anchorage may be obtained, in 15 to 25 fathoms water, at a half to three quarters of a mile off shore.

The island, which is about $2\frac{1}{2}$ miles long by $1\frac{1}{2}$ miles broad, attains an elevation of 862 feet, and this highest part, which is nearly in the centre of the island, is in lat. $38^{\circ} 43'$ S., long. $77^{\circ} 34'$ E. The time of high water, full and change, is 11h. 30m.; rise 2 to 4 feet.

Amsterdam, the northern island, is about 4 miles in length and breadth, and lies nearly on the same meridian as St. Paul, from which it is distant about 51 miles. The summit of this island, which is frequently enveloped in haze, is 2,750 feet high, and in lat. $37^{\circ} 52'$ S., long. $77^{\circ} 35'$ E.

The strong westerly gales and thick weather that are met with near these islands in the winter, render caution necessary in approaching them during that season, the colour of the water affording no certain indications of their vicinity, and the seaweed they produce being drifted to leeward in small patches, by the prevalent north-easterly current.

WINDS in the INDIAN OCEAN.—To the southward of the south-east trade the winds are variable. Between the parallels of 30° and 40° S.

and snow, and the terrific and irregular seas which have been frequently encountered in the higher parallels adopted.

Independently of the extreme severity of the climate occasionally experienced in high latitudes, there exists the lurking danger of disrupted masses of ice and ice-bergs of larger dimensions. The absence or approximate positions of these dangers cannot be depended on for any season of the year, they are however rarely encountered North of 40° S., except in the vicinity of the Cape of Good Hope. Between 40° and 45° S. they have been occasionally fallen in with extending as far as the 65th meridian of E. longitude, on the 45th parallel as far as 135° E., and on the 50th parallel extending to 140° E.

* See Charts.—Indian Ocean, Cape of Good Hope to Australia, No. 2483; scale, $d = 0.2$ of an inch; and Tables to facilitate the practice of Great Circle sailing, by J. T. Towson, published at the Hydrographic Office; also Ice Chart of Southern Hemisphere, No. 1241.

the Peninsular and Oriental Steam Navigation Company's ships found the prevailing winds from S.W. and N.W. But between the parallels of 40° and 44° S., from the meridian of the Cape of Good Hope to Tasmania, strong winds from North and N.N.E. have been frequently encountered, shifting sometimes suddenly to N.W. and westward. According to Horsburgh's East India Directory, several ships have experienced these northerly winds when steering for Bass strait, which drove them to the South of that route, and obliged them to proceed southward round Tasmania.

The Barometer in the greater part of the Indian ocean generally rises with southerly and falls with northerly winds, although a heavy gale from either quarter may be preceded by a falling barometer, as was observed in H.M.S. *Beagle* between St. Paul and Amsterdam isles and Swan river. On the 1st of November the *Beagle's* barometer had gradually risen to 29.90, with fresh winds from North and West, it then fell in two days to 29.34, with strong winds from N.N.W., when, after a heavy gale, the wind veered to the westward, with a rising barometer and finer weather. On the 8th of the same month the barometer was 30.05, with fine weather, and the wind from S.E. by E.; it then fell to 29.80, and there blew a heavy gale from S.E.; after which the weather became more moderate, and the barometer began to rise.*

CURRENTS.—The Indian ocean, like those of the Atlantic and Pacific, has its equatorial, counter, and variable currents, besides those near the land. One of these, the Agulhas current off the south-east coast of Africa, flows south-westward towards the Agulhas bank; and when to the westward of about lat. 37° S., long. 22° E., it is divided into two branches, one turning N.W. to the Cape of Good Hope, and the other eastward into the counter current of the Indian ocean.

This counter current, which is mostly found between the parallels of 37° and 40° or 42° S., is a continuation of that from the Atlantic ocean, combined with the returning branch of the Agulhas current, already mentioned. The counter current, as it runs to the eastward, mingles with the waters of the polar current flowing towards the equator, and sets E.N.E. and N.E. The rate of the counter current is variable, depending upon the winds; in the meridian of cape Agulhas its mean velocity is about 30 miles a day.

Off Cape Leeuwin the counter or polar current divides into two branches, one flowing north-westward along the west coast, and the other eastward along the south coast of Australia.

* For winds and currents on the southern coasts of Australia, see Chapter IX.

DIRECTIONS.—CAPE of GOOD HOPE to CAPE LEEUWIN.—For a vessel bound to the south coast of Australia, not touching at the Cape of Good Hope, the best route is to enter the Indian ocean between the parallels of 37° and 38° S. ; or from the Cape to steer about South until between those parallels, in order to avoid the north-west current across the Agulhas bank, and to take advantage of the easterly counter current in the Indian ocean.

From about 200 miles southward of the Cape of Good Hope, keep between the parallels of 38° and 40° S., sighting the islands of St. Paul or Amsterdam, if desirable to verify the longitude before making the land of Australia. It may be here observed that many seamen prefer the route between the parallels of 36° and 37° S., where they say the wind is more steady than in a higher latitude.

After leaving St. Paul and Amsterdam islands, continue eastward on the parallel of about 38° S. to profit by the prevailing westerly winds, until the meridian of Cape Leeuwin in 115° E. is reached, and then proceed eastward for either of the Australian colonies, as directed in Chapter IX.

CHAPTER I.

AUSTRALIA.—SOUTH COAST, CAPE LEEUWIN TO CAPE
CATASTROPHE.

VARIATION from 6° West to 4° East, in 1868.

THE south-west coast being that part of Australia which is generally approached by ships navigating to the southern colonies of Australia from most countries in the world, Vol. I of this work commences at Cape Leeuwin with a description of the South coast, and proceeding towards Tasmania or Van Dieman Land, and Bass strait, conducts the navigator along the East coast to Sydney; from whence Vol. II. will describe the remaining portion of the East coast, the Coral sea, the Southern coast of New Guinea and Torres strait; and Vol. III. will complete this fifth division of the globe by describing the North and Western coasts from Torres strait to the spot from which these directions commence.

CAPE LEEUWIN (Lioness), the south-west extremity of New Holland, is in lat. 34° 21' S., long. 115° 6' E., according to Capt. Flinders; the general accuracy of whose charts has been greatly relied on for the following description of the South coast. The cape is formed of tolerably elevated land, of smooth but sterile aspect, and is visible 30 miles in fine weather; it is defended between S.W. and S.E. by rocky islets, or detached breakers, to the extent of 5 or 6 miles, the cape itself appearing like a small, low, rocky island lying close to the main-land, with lower land on its north side, and a very remarkable large bare patch of sand on the coast, about 10 miles to the north-westward of it.*

The approach to this prominent feature on the Australian continent does not seem to be marked by the usual indications of the proximity of land, the water retaining its usual colour, without any sea-weed at its surface, or a greater number of oceanic birds than are usually met with in the run from St. Paul isle.

* See Charts of Australia :—General Chart, Southern portion, No. 2759 b; scale, $d = 1$ inch; and South Coast, sheet 1, Cape Leeuwin to Cape Arid, with King George sound, No. 1,059; scale, $m = 0.08$ of an inch.

The SOUNDINGS are not regular, and do not extend far off shore, there being 85 fathoms at 28 or 30 miles to the S. by W., and 40 to 60 fathoms at 18 miles to the southward of the cape.

GÉOGRAPHIE REEF, the westernmost of the dangers known to exist in the vicinity of Cape Leeuwin, is a rock, with less than 3 fathoms on it, on which the French corvette *Géographie* nearly struck in 1803, and which has since been seen by several vessels. It does not always break, and lies 6 miles from the nearest point of the main-land, bearing W. by N., distant nearly 10 miles from the cape, and S.S.W. from the Remarkable sand-patch. The soundings give little warning of its vicinity, the depth of water being 24 fathoms at one-sixth of a mile from its north-west and south-west sides; other reefs, partly dry, are scattered over the space between this rock and the main-land, but they do not extend to the northward of the Remarkable bare sand-patch.

The RAMBLER ROCK, a small cluster even with the water's edge, said to have been seen by the *Rambler*, merchant vessel, lying W.S.W. 12 or 15 miles from the Remarkable bare sand-patch, having been sought for in vain, by H.M.S. *Beagle*, and other vessels, it was not noticed in Vol. III. of the Australia Directory; but the report of its existence has since been confirmed by Commander Belches, formerly Port Master at King George sound; and also by Lieutenant W. Chimmo in 1853, who, however, places it N.W. $\frac{1}{3}$ N. 14 or 15 miles from the south extreme, and 8 miles from the nearest land.

CAPE LEEUWIN BAY.—There is said to be a small bay between the Remarkable bare sand-patch and cape Hamelin, about 2 miles to the southward of it, affording good anchorage three-quarters of a mile in extent, well sheltered from all westerly winds by an island in front, which is connected with the main-land by a reef at its north end, but has a clear channel half a mile wide, into the bay round its south side. There is a small lake of fresh water at 150 yards behind the shore of the bay; but as the reefs abreast are not yet well known, this place should be approached with caution.

From cape Hamelin the coast takes a S.E. direction to Cape Leeuwin, and is fronted by several small islands and reefs. To the eastward of Cape Leeuwin the coast trends E. by N. $\frac{1}{2}$ N. about 3 miles across a small bight to Matthew point.

ST. ALOUARN ISLETS.—These rocky islets and reefs form a chain extending S.S.E. 4 or 5 miles from the land of Cape Leeuwin. The two southernmost dry rocks, which lie close together, present a bluff face to the S.W. and slope to a point in the opposite direction. A sunken ledge extends a short distance from their south-east side, and another a mile to the W.S.W., from which, in the direction of Capes Leeuwin and Hamelin, to the

N.W., the ground is foul and rocky. There are no visible dangers beyond a quarter of a mile from the east side of the islets and rocks.

FLINDERS BAY extends from Cape Leeuwin E. by S. $\frac{3}{4}$ S. 19 miles to Black point, and is 9 miles deep: a reef of black basaltic rocks extends nearly a mile from the point. This bay being exposed to the S.E., from which quarter strong gales sometimes blow in summer, it should not be entered at that season; but there is good winter anchorage off the mouth of Hardy inlet, in the north-west corner of the bay, shipping being protected from all northerly and westerly winds by the main-land, and from those from the southward by the St. Alouarn islets and reefs.

AUGUSTA was formerly a small settlement at the mouth of Hardy inlet, with a barrack and flag-staff at a little more than a mile to the southward of it. Between Barrack point and the entrance of the inlet the shore is fronted by reefs nearly awash, between which are boat channels to the sandy beaches on the main-land.

ROCKY LEDGE.—Mr. Cole, master of an American whaler, has reported the existence of a narrow rocky ledge, bearing S.E. by E. $\frac{1}{2}$ E. from the barrack and N.E. from Matthew point, the western extremity of the land. The ledge is steep, pointed, and not more than 3 yards over, with 22 feet on the shoalest part, 7 fathoms close on the east side, and 6 fathoms on the west side of it.

ANCHORAGE.—The best anchorage in Flinders bay, recommended by the master of H.M.S. *Sulpher*, is in 7 fathoms, stiff brown clay, with the barrack or flag-staff bearing W. $\frac{3}{4}$ N., Matthew point S.W. $\frac{1}{2}$ S., and the centre of the principal Alouarn islet S. $\frac{1}{2}$ E.; but since the later discovery of the Rocky ledge just mentioned, a vessel of heavy draught should not proceed to the northward of the barrack, or bring Matthew point to bear to the southward of S.W. until this danger is better known.

The bar at the mouth of Hardy inlet is very shallow, having seldom more than 2 or 3 feet water on it, except in winter, when the freshes from the river deepen it to 6 feet, independently of a rise of 3 feet more, occasionally caused by north-west gales.

Supplies.—Good fresh water is to be had from a running stream on the north side of the flag-staff, and firewood is abundant within Hardy inlet. Fresh provisions may also be procured from the settlers still remaining in the neighbourhood of Augusta.

During the summer months land and sea breezes prevail in Flinders bay, interrupted occasionally by smart gales from the S.E. blowing directly into the bay, and distressing vessels, not well found in ground tackle.

TIDES.—There appear to be no regular tides in Flinders bay, and the usual rise does not exceed 2 or 3 feet.

The COAST from Black point takes a general S.E. $\frac{3}{4}$ S. direction 37 miles to D'Entrecasteaux point; it is slightly embayed and is sandy, rocky, and uninviting, having two small bays open to the westward, one at 6 and the other at 18 miles to the north-westward of D'Entrecasteaux point; but the whole space being fully exposed to a heavy swell from the S.W., it should not be approached in light winds; and it affords no secure landing for a boat on any part of it.

D'ENTRECASTEAUX POINT, is a steep rocky cape, and one of the most remarkable projections on this coast; it is visible 30 miles from a ship's deck. Low islet lies South between 2 or 3 miles from the point, and breakers extend at least the same distance still farther South, having 30 fathoms water at 2 miles westward of their extremity. Another low islet, called by the sealers Sandy island, lies E.S.E. 3 miles from the point, and three-quarters of a mile from the main-land to the northward. The island affords good shelter for coasters, and is said to yield fresh water by digging in the sand. The anchorage must, however, be approached with care, on account of reefs in its vicinity, the positions of which are not shown on any chart. At about S.S.W. 35 miles from D'Entrecasteaux point Captain Vancouver could not find bottom at 220 fathoms.

From D'Entrecasteaux point the coast, which forms a slight indentation, extends nearly S.E. by E. $\frac{1}{2}$ E. 24 miles to Clifly head, at 7 miles to the north-westward of which there appears to be a small opening, with heavy breakers on its bar.

ASPECT.—To the eastward of D'Entrecasteaux point the coast improves in appearance, it being more elevated, better clothed with vegetation, and projecting in cliffy points, with sandy bays between them, which at a distance give it the appearance of several islands. Various shallow estuaries, of considerable size, discharge into these bays during the winter months; but with the exception of Nornalup inlet, 36 miles to the eastward of D'Entrecasteaux point, their entrances are choked with dry sand bars at other seasons of the year.

WHITE TOPPED ROCKS.—At nearly S.E. by S. 15 miles from D'Entrecasteaux point there are two small but rather high, white, flat-topped rocks, lying about 10 miles from the nearest land. There are 65 fathoms on a bottom of white sand, at S. by W. 18 miles from them, and apparently a clear channel to the northward; but with a leading wind it is prudent to pass outside. This depth of 65 fathoms is 10 or 12 miles from the edge of soundings, which do not appear to extend farther off this part of the coast than 27 or 30 miles. These rocks lie 29' 30' E. of Swan river, and when made out show a vessel's position.

CLIFFY HEAD and CHATHAM ISLE.—The head may be seen from a ship's deck at the distance of 80 miles, and at 1 mile to the southward of it is Chatham isle, which is smooth, steep, rocky, and of considerable elevation. The soundings at 18 or 20 miles to the southward of Clifty head are 60 to 65 fathoms, and 40 fathoms at 9 miles; within which distance they are irregular, with deep water close to the shore.

NUYTS POINT, S.E. by E. $\frac{1}{2}$ E. 8 miles from Clifty head, is also clifty and projects 3 miles beyond the line of coast, and is visible about 25 miles from a ship's deck. In the intermediate bight is a reef of rocks, and Black rock lies close off Nuyts point.

From Nuyts point the coast trends into a bay 2 miles deep and extending E. $\frac{3}{4}$ S. 10 miles to Rame point, which is fronted by a reef 1 mile in extent.

SADDLE and GOOSE ISLES.—Saddle isle, so named from its resemblance to a saddle with extended flaps, lies East 4 miles from Nuyts point, and at $1\frac{1}{2}$ miles to the southward of Saddle isle is Goose islet, which is smaller than the former. There is a clear 12-fathoms channel between the two islands; and the only known danger in the vicinity is a small surface reef about S.S.W. three-quarters of a mile from Goose islet. During the bay-whaling season of winter, whalers have found a somewhat precarious anchorage, in 4 fathoms, close on the north side of Saddle isle, sheltered on the South and West by the island, and by a reef partly above water, which projects from its western end. Between this reef and the main-land there is a narrow channel of 6 and 7 fathoms, and close to Rocky head, 2 miles to the north-eastward of Saddle isle, there are 10 fathoms; but a heavy surf continually lashes the whole, and renders the place an unsafe and wild resort, unless for small craft that can run into Nornalup inlet, on the east side of Rocky head, or for ships seeking only a temporary anchorage. In the latter case the anchor should be weighed immediately the wind shifts to the southward of East or West, or it threatens in the N.W.

NORNALUP INLET is an extensive sheet of water in the bottom of the bay, nearly mid-way between Nuyts and Rame points; it is full of shoals and receives two rivers, navigable for boats; the banks of these rivers being covered with the finest timber for naval purposes. The entrance to the inlet lies between the abrupt Rocky head, before mentioned, which projects in an E. by S. direction, and a low sandy point to the North of it, extending to the W. by N. From North of Rocky head, a vessel by going W. by N. 200 yards, and the same distance N.N.W., will pass through 5 and 6 fathoms to the bar, which extends westward, in heavy rollers from the low sandy point to within 30 yards of the opposite high, steep shore, the deepest water being close on the west side of a small surface rock, which there shows the channel, and which always

breaks. The available depth for a vessel near this rock, does not appear to be always the same, or to be depended on without previous sounding in a boat.

Some persons have found as much as 12 feet in this channel at low water, without any difficulty of entry, whilst others report only 4 feet, and that the passage is always attended with danger, even to boats, on account of the heavy swell which constantly rolls into the bay, even during light winds and the finest weather. This must especially be the case during the summer months of January, February, and March, when strong south-east winds are sometimes encountered on this coast, and blow directly into the inlet.

Supplies.—Fresh water is abundant on the main-land and on Saddle isle, the sea abounds in fish, and the inlet and rivers in water fowl.

IRWIN INLET.—At 3 miles to the eastward of Rame point is another projection of less elevation, rocky and fronted by a reef. Round its east side is a sandy bight, in the north-west corner of which there is a dry sand-bar at the entrance to Irwin inlet, a similar estuary to that of Nornalup, but only open occasionally after winter rains. This bight is fully exposed to all southerly winds, and offers no secure anchorage.

HILLIER POINT and WILLIAM BAY.—Hillier point bears nearly E. $\frac{1}{4}$ S. from Nuyts point, distant 23 miles; it is clifty, and higher than the adjoining coast, and may be recognized by Stanley islet, a broad rock, lying near its south-east extremity. On the east side of the point is William bay, which extends nearly 4 miles across in an East direction to Edward point, and is $1\frac{1}{2}$ miles deep, with the mouth of Parry inlet in its north-west corner, choked by a bar of dry sand. The bay is full of sunken rocks. At 5 and 6 miles off this part of the coast there are 30 to 40 fathoms water, the shore being rocky and steep, and apparently free from outlying dangers.

RATCLIFFE BAY and WILSON INLET.—At East, 5 miles from William bay, is Ratcliffe bay, which is somewhat smaller, but equally exposed to all southerly winds. Wilson inlet, a considerable fresh estuary behind the coast, discharges its superfluous waters into this bay in winter, but at other seasons it is blocked up by a broad bar of dry sand.

BENNETT RANGE rises somewhat abruptly from the western shore of Wilson inlet, and has several remarkable and well defined summits, the highest of which, mount Lindesay, bears N. by W., distant 10 miles from the mouth of the inlet, and attains an elevation of 1,265 feet above the sea.

WEST CAPE HOWE, is a sharp clifty head, nearly E. by S. $\frac{1}{2}$ S. 28 miles from Hillier point, terminating to the southward and S.W. in perpen-

dicular rocky bluffs of moderate height and even aspect, rising gradually behind the coast to hills of nearly 800 feet elevation.

TIDES.—It is high water at West Cape Howe, full and change, at 9h.; rise 6 feet.

TOR BAY, which includes Ports Harding and Hughes, extends from West Cape Howe E. $\frac{1}{2}$ N. 7 miles, and is 4 miles deep, but it is too much exposed to the southward and S.E. to afford secure anchorage for shipping, although the islets and reefs in the bay give shelter to coasters. From West Cape Howe the coast trends N. by E. 5 miles to Forsyth bluff, which separates two long sandy beaches in the bight of the bay. Seagull isle, which lies $1\frac{1}{2}$ miles from the north and western shores of Tor bay, is small and rocky, but conspicuous, with a reef partly dry, extending a little more than half a mile from its west and south-west sides.*

Mr. C. C. Forsyth, H.M.S. *Pelorus*, who made a partial survey of Tor bay in 1838, found 12 to 8 fathoms on a rocky bottom, extending one mile to the N.W. of Seagull isle, deepening quickly to the eastward, and shoaling rapidly close to a detached covered reef, which lies E.S.E. half a mile, from the bluff: 10 to 7 fathoms were also found in a channel three-quarters of a mile wide, on the western side of the Seagull reef.

PORT HARDING.—At West, $1\frac{1}{2}$ miles from Seagull isle there is good shelter for coasters in Port Harding, formed by Migo and Richard isles, nearly joining to the main-land, with $1\frac{1}{2}$ to 3 fathoms water between. Several dry and covered reefs extend half a mile N.E. and northward from Migo isle, which is the northern of the two; and between these reefs a 5-fathoms channel leads in a S.W. direction towards the best sheltered anchorage, which is in 3 fathoms, except close on the north side of a small bare rock that fronts a sandy beach abreast of Migo isle. For larger vessels than coasters there is anchorage in 5 fathoms, sandy bottom, at North one-third of a mile from Migo isle, but the space is very limited, and surrounded by reefs and 3-fathoms patches.

PORT HUGHES.—Shelter isle, nearly N.N.E. 2 miles from Seagull isle, is somewhat larger than Migo, and forms with the main-land on its north side, the small boat harbour of Port Hughes, in which a vessel not drawing more than 8 or 9 feet water, might lie land-locked in perfect security, or heave down to the island. The entrance is at the west end, and is not more than 50 or 60 yards wide, the east end of the island being connected with the shore by dry and covered rocks, which cause smooth water inside.

* As Chart No. 1059 is on too small a scale to show correctly the various islets and reefs in Tor bay, it should be entered with due caution.

From the bight of Tor bay the shore stretches eastward, and again becomes rocky and bold ; and at $1\frac{1}{2}$ miles south-eastward of the eastern point of the bay there are two other islets lying close together, with a small rock off their west side.

Supplies.—On the beach abreast of Migo isle, coasting vessels of 40 and 50 tons are built by the colonists, from the very fine timber which covers the Guarrinup range of hills, at half a mile in the rear ; and at the north end of the beach good water is to be found at all seasons of the year.

PEAK HEAD, E. $\frac{1}{2}$ S. 14 miles from West Cape Howe is a bold rocky projection, presenting to the southward a rugged sloping bluff, exactly resembling a human face in profile ; the crown of the head is the highest peak of this projection, from which it has a broken rocky descent towards the promontory of Bald head, to the eastward, and forms a bight on each side ; that to the westward has a reef extending a short distance from its western extremity.*

BALD HEAD.—In lat. $35^{\circ} 6' 54''$ S., long. $118^{\circ} 1' 36''$ E., and E. by N. 3 miles from Peak head, is the eastern extremity of a peninsula, which forms the south side of the entrance of King George sound, and is visible 36 miles from a ship's deck, in clear weather. It is of considerable elevation, of even aspect, and rounds off at the extremity with a smooth surface of rock almost entirely destitute of vegetation, which gives it the appearance of being an elevated island of steril white aspect, when approached from the eastward. At the foot of its extremity, on the south side, lies a rock even with the water's surface, but it is otherwise quite safe to approach, having 10 and 12 fathoms close to the shore, which is very steep.

EOLIPSE ISLES, of Captain Vancouver, are a cluster of small rocky islands lying between 3 and 6 miles off the land to the westward of Peak head ; and with the exception of the largest, which is about $1\frac{1}{2}$ miles long, E.N.E. and W.S.W., and half a mile wide, they are destitute of vegetation. The principal island rises in several green hummocks towards the summit, which is of a round form, and visible 24 miles from a ship's deck, in clear weather ; it bears from West Cape Howe E.S.E., distant 11 miles, and from the extremity of Bald head S.W. by W. $\frac{1}{4}$ W. 8 miles.

The others of this cluster are three rocky barren islets lying nearly a mile off the south-west end of the principal island, and surrounded with rocks and breakers. There is a clear channel in shore of the whole, by borrowing towards Peak head, in order to avoid a patch of breakers about a mile N.W. of the principal island, which is the only danger known to exist in

* See Plan of King George sound and Princess Royal harbour, with views, No. 2,619 ; scale, $\pi = 1.7$ inches.

their vicinity, and at a mile off the opposite side there is no bottom with 30 fathoms.

CAUTION.—These islands, which have not yet been surveyed, are the southernmost land on this coast, and should be avoided in working to the westward, on account of the current, which here runs strong in the opposite direction, during the prevalence of westerly winds.

MAUDE REEF, which also has not yet been surveyed, but is said to be about a quarter of a mile in diameter, lies E. by S. $\frac{1}{2}$ S. $3\frac{1}{4}$ miles from the summit of the largest of the Eclipse isles, which is the nearest land to this danger. This reef appears to have 3 or 4 fathoms on its shoalest part, and does not always break. The soundings do not indicate its vicinity, there being 45 fathoms at $2\frac{1}{4}$ miles S.E. by E. $\frac{1}{2}$ E., 44 fathoms at the same distance S.S.E. $\frac{1}{2}$ E., and 47 fathoms at $3\frac{1}{4}$ miles S. $\frac{3}{4}$ E. from it, the bottom being coarse sand with coral and stones.

VANCOUVER REEF, nearly S.W. $\frac{1}{4}$ S. $2\frac{1}{4}$ miles from Bald head, is small in extent, with a flat rock in the centre, just even with the water's edge. This danger appears to be steep on every side, as the swell which generally rolls in from the southward and westward upon this part of the coast, breaks violently and with great abruptness over it. The nearest land in its neighbourhood is Peak head, the summit of which bears N.W. $\frac{3}{4}$ W., distant nearly 2 miles; but this reef should be avoided in the night, as the soundings give no warning of its vicinity.

DIRECTIONS.—A ship passing outside the Eclipse isles may avoid both Maude and Vancouver reefs by keeping the southernmost islet to the northward of W. by N., until the west end of Breaksea island opens beyond Bald head, bearing N.N.E. There is a good clear channel in shore of both these reefs by borrowing towards Peak head; the only known danger on the north side of Eclipse isles being the patch of sunken rocks, lying three-quarters of a mile off the north west side of the largest Eclipse isle; but this passage should not be used during very light winds, as the swell is usually heavy near the shore, and there is no anchoring ground.

CAUTION.—When approaching King George sound from the westward, the mariner is cautioned that the light on Breaksea island may first be seen over the sinking of Bald Head ridge, bearing N.E. $\frac{1}{4}$ E., but does not become fairly open until bearing N.E. $\frac{1}{4}$ N.; and it should be brought to bear N.N.E. $\frac{3}{4}$ E. before steering for it, when the vessel will be to the eastward of Maude and Vancouver reefs.

KING GEORGE SOUND is the most convenient port on this part of the coast for re-fitting, wooding, watering, and procuring supplies, and is the the West Australian mail station for the Peninsular and Oriental Steam Navigation ships.

The entrance of King George sound, which is divided into three channels by Breaksea and Michaelmas islands, extends from Bald head, N. by E. 5 miles to the main-land, and from the entrance about the same distance westward to Princess Royal harbour, the entrance of Oyster harbour being in the north-west bight of the sound.

BREAKSEA ISLAND. N.E. $\frac{1}{2}$ N., 3 miles from Bald head, is an elevated rocky mass $1\frac{1}{2}$ miles long, E.S.E. and W.N.W., and nearly half a mile broad, with a small but high round islet close to its eastern end, and a landing place near its north-western extreme, which has lately been rendered more safe by the erection of a landing-stage.

BREAKSEA ISLAND LIGHT.—A light-tower of iron, rising from the centre of the keeper's dwelling, and 43 feet high, stands on the summit of Breaksea island, 1,200 yards within its eastern extremity, and exhibits a *fixed white* light at an elevation of 384 feet above the sea, at high water. The light is dioptric, of the third order, and is visible in clear weather, from a distance of 25 miles seaward, between Bald head and cape Vancouver, the foot of mount Gardner on the main-land to the eastward, or between the bearings, from a vessel, of N.E. $\frac{1}{4}$ N. and W. by S. ; but in approaching the sound from the westward, it may first be seen for a brief interval over the sinking of Bald Head ridge, bearing N.E. $\frac{1}{4}$ E. Within the sound it illuminates all round the compass, though hidden to a small vessel passing North of Michaelmas island.*

The passage between Bald head and Breaksea island forms a clear working channel $2\frac{1}{4}$ miles wide, with 33 to 11 fathoms, the shoalest water being on Belches Foul ground.

BELCHES FOUL GROUND.—The alleged danger called Belches rock, in the fairway of the passage between Bald head and Breaksea island has been ascertained to consist of several patches of foul ground, extending $1\frac{1}{2}$ miles nearly North and South, and rather more than a mile East and West, with not less than 11 fathoms water on them ; but being elevated 18 fathoms above the bottom of that part of the sound which is open to the ocean swell, an alarming disturbance of the fair run of the sea over them is occasioned under certain concurring, but rarely happening circumstances.

This foul ground lies three-quarters of a mile outside, or to the eastward of a line drawn between the extremity of Bald head and the eastern extremity of Breaksea island. From 11 fathoms on the south-western patch Bald head lies W. by S. 1 mile, and from the north-easternmost, a spot of 12 fathoms, Breaksea Island light-house bears N.N.E., distant 2 miles. Breaksea Island light-house kept to the westward of North clears them

* The distance at which the lights are visible is calculated from a height of 15 feet above the horizon, at high water.

when passing to the eastward, and the light-house not brought to the northward of N.N.E. $\frac{3}{4}$ E. will lead to the westward of the 11-fathoms patch.

MICHAELMAS ISLAND, which is separated from the north-western extreme of Breaksea island by a deep passage three-quarters of a mile wide, is of the same description, but smaller and more elevated than Breaksea island ; neither of them having more than a few tufts of vegetation near their summits. A shoal with 2 to $3\frac{1}{2}$ fathoms on it, extends 2 cables' lengths to the northward from the north-western side of the island, and at two-thirds of a mile off its west end is a rock with $3\frac{1}{2}$ fathoms on it.

There is a channel one mile wide between Michaelmas island and a point of the main-land to the northward, the depth of water in it being 15 to 5 fathoms, except on Herald rock, where there are 15 feet water.

HERALD ROCK, a cluster of rocks 2 cables' lengths in diameter, with as little as 15 feet water over its summit, but having 8 fathoms close to, was discovered in the North channel, between the northern elbow of Michaelmas island and the nearest projection of the main-land, at two-thirds of a mile from the former. This danger lies with the eastern extremity of Breaksea island just open of the east extreme of Michaelmas island bearing S.S.E. $\frac{1}{2}$ E., and Seal islet S.W. $\frac{3}{4}$ W. It is cleared on the eastern side, by keeping Breaksea Island light-house open of the east end of Michaelmas island ; and a vessel will be to the westward of it so long as Bald head is open of the west end of that island.*

From Bald head the south shore of King George sound trends N.W. by N. $1\frac{3}{4}$ miles to Limestone head, and then curves round westward to the south-west bight of the sound, from whence a low narrow neck of land projects about $1\frac{1}{2}$ miles northward to a hilly peninsula, close to the eastward of which is Mistaken isle, bearing N.W. by W., distant 3 miles from Limestone head.

SEAL ISLET and SOUTH FLAT ROCK.—The islet, although small, is elevated, and lies in line with, and nearly midway between Limestone head and Mistaken isle. The rock lies S.W. by S. nearly $1\frac{1}{4}$ miles from Seal islet, and at a quarter of a mile from the shore.

Wood and Water.—A ship only wanting fuel and water may anchor in a sandy bay in the south-west part of the bight between Limestone head and Mistaken isle, where two or three streams of excellent water run into the sea over the sand, from which a ship might complete her hold in a day or two,

* This may be the patch on which Mr. W. C. Doutry, Lloyd's Agent at Albany, states that the sloop *Van Capelle* touched lightly, when Michaelmas island bore South.

by digging a well to collect it. Wood may also be procured at this place ; but not of so large a size, nor perhaps of so good a quality, as at other parts. This bay is readily found by its being the first to the westward of a rocky point that projects from some remarkable bare sand-hillocks, as also from its being the second sandy beach to the westward of South Flat rock. The anchorage is good, being a bottom of sand and weeds, and is sufficiently protected from easterly winds by Breaksea and Michaelmas islands. A very convenient berth is in 8 or 9 fathoms at one-third of a mile from the shore, with the centre of Michaelmas island over Seal islet, and South Flat rock S.E. by E. three-quarters of a mile. During the winter months, a berth so near the shore should not be retained longer than may be necessary for completing a supply of water.

The anchorage between Seal islet and the first sandy beach to the westward of Limestone head, with South Flat rock bearing W. by S. $\frac{1}{2}$ S., in 6 or 7 fathoms, sand and weeds, should be preferred during the summer months ; for the easterly winds then prevail, and sometimes blow strong, even as late as March ; the anchorage is land-locked, excepting in the direction of E. by N., where the sea horizon is open to the extent of only 10° . There is no water nearer to this anchorage than in the sandy bay above mentioned.

The entrance of Princess Royal harbour being very narrow and contracted by shoals, a ship only requiring water, should give the preference to the anchorage South of Seal islet, where she would not be subject to any detention from easterly winds, that are fair for running along the coast to the westward, but which would confine a ship in Princess Royal harbour. Captain C. R. D. Bethune, R.N., states, that good anchorage may also be found West of Seal islet in $5\frac{1}{2}$ fathoms, at half a mile from the shore, where water might be completed more expeditiously than in any other place, as the casks might be filled in the boat. By a little digging two frigates might water at one time.

THE SOUNDINGS in King George sound are generally regular ; the deepest water is 26 fathoms at about a mile westward of Breaksea island : to the westward of the meridian of Limestone head the depth mostly ranges between 12 and 6 fathoms, over a sandy bottom.

PRINCESS ROYAL HARBOUR LIGHT.—A light-house consisting of a small wooden square tower 17 feet high, with the keeper's dwelling attached, and presenting the appearance of a cottage, is erected on the extremity of King point, the northern bluff of the narrow entrance of this harbour. The light, which is *fixed white*, and 37 feet above high water, is of the fifth order, and visible in clear weather, through the approaches to the harbour, from a distance of 10 miles.

PILOTS.—The pilot house, a white cottage, is situated on the north side of the entrance of Princess Royal harbour, at one-third of a mile to the westward of the light-house. For the harbour, it is desirable to take a pilot, who will be found on the alert. The charge is 2*l.* for 8 feet draught, and 5*s.* for each additional foot.

PRINCESS ROYAL HARBOUR is the most convenient of the inner ports of King George sound, on account of the deep water in its narrow entrance, and its having no bar. The entrance, which is only one quarter of a mile wide, lies between Possession and King points, and bears from Breaksea Island light W. by N. $\frac{3}{4}$ N., distant $6\frac{3}{4}$ miles; the deepest water is on the north side, where there are 4 and 5 fathoms, deepening to 6 and 8 fathoms within the narrows.

BUOYS.—A flat extends $1\frac{1}{2}$ cables' lengths from Possession point, on the northern edge of which is moored a *white* cask buoy, in 22 feet; and near the southern edge of another flat, extending 2 cables' lengths from the cliffy point under the pilot house, is moored a *black* cask buoy in 21 feet.

BRAMBLE ROCK, which is shown by a beacon post, lies close off the west extremity of Possession point, and derives its name from H. M. S. *Bramble* having been nearly wrecked on it in 1843, during a hurricane from the westward.

Although Princess Royal harbour is $4\frac{1}{2}$ miles long, N.W. and S.E., and 2 miles wide, about 2 square miles only of the northern portion is available for vessels of more than 8 or 9 feet draught, as a shallow flat extends from the southern and western shores.

ALBANY is situated on the north side of Princess Royal harbour, between mount Clarence on the east, and mount Melville on the west side, the landing-jetty being a little more than a mile within the pilot house.

Geographical Position.—For the purpose of rating chronometers, the commissariat house, near the jetty, may be considered in long. $117^{\circ} 54'$ E., and is in lat. $35^{\circ} 2' 20''$ S.

Supplies.—Refreshments and supplies of all kinds may be obtained, and a ship may be refitted at Albany. It possesses by far the finest harbour in Western Australia, and is situated in one of the most healthy parts of the continent, it being never visited by hot winds, and the thermometer being rarely below 60° or above 85° . This evenness of temperature at all seasons of the year is very remarkable, and renders this spot particularly suitable for invalids, as many persons even come from Swan river for the benefit of their health.

DIRECTIONS.—A vessel having passed Bald head may haul westward for one of the anchorages in King George sound, or—if well acquainted with the locality and she has a leading wind—for Princess Royal harbour,

when the harbour light-house bears N.W. by W. $\frac{1}{4}$ W. If it be necessary to avoid and pass to the southward of Belches foul ground, Princess Royal Harbour light-house should not be brought to the westward of N.W. $\frac{1}{4}$ W. until Breaksea light-house bears to the eastward of N.E. $\frac{3}{4}$ N.; but if more convenient to pass between the foul ground and Breaksea island, the harbour light-house kept on a N.W. by W. $\frac{1}{2}$ W. bearing will lead through.

Middle Channel, between Breaksea and Michaelmas islands, is clear of danger, and a vessel will preserve the fairway track by steering for the harbour light, nearly W. by N. $\frac{1}{2}$ N.

Northern Passage.—The passage North of Michaelmas island should be made to the southward of Herald rock by keeping the north side of Rocky islet in line with the south point of Cape Vancouver islet bearing East. This passage is not to be recommended at night, but the harbour light W. $\frac{1}{2}$ N. will lead through, remembering that the Michaelmas island side is the safest, and Breaksea Island light will be hidden to vessels while passing Michaelmas island.

Princess Royal Harbour.—On closing Princess Royal harbour, bring a remarkable sand-cliff on its western shore, in line with the entrance bearing W. by S., which is a good direction for taking the narrows, and will lead to between King point and the *white* cask buoy on the edge of the flat extending from Possession point. From this the channel trends S.W. by W. $\frac{1}{2}$ W. for half a mile to the inner narrow, which is half a cable wide, with a depth of 5 fathoms, having on the northern side the *black* cask buoy, marking the flat extending from the cliff, on which stands the pilot house, and on the southern side Bramble rock beacon post. When the *black* buoy and pilot house are in line the vessel may steer in West, and when the church at Albany bears N.W. by N. anchor in $4\frac{1}{2}$ fathoms, sand and weeds, with Michaelmas island half shut in by Possession point: a vessel should moor.

OYSTER HARBOUR, in the north-west corner of King George sound, has a very narrow entrance, with a bar, somewhat rocky, at a quarter of a mile outside of it, and about N.E. 2 miles from Princess Royal Harbour light. Captain P. P. King, R.N., who surveyed it, writes,—“Over the bar of Oyster harbour there is not more than $10\frac{1}{2}$ feet at low water, and in the neaps 12 feet at high water; but it is likely that, at spring tides, there may be 14 feet, or perhaps more, if the wind is blowing into the harbour; but during the springs, high water always takes place at night, and it would not, therefore, be prudent to attempt to pass the bar at that time.

DIRECTIONS.—A vessel intending to go into Oyster harbour should anchor in 3 fathoms, sand, off the sandy beach immediately to the eastward of

the entrance, that is, between the breakers off the point and the bar, bringing the summit of Green islet, in the harbour, in one with the extremity of the bushes of the west point of entrance, and the highest part of Breaksea island in a line with the outer point of the bay ; a boat should then be sent to sound the bar. The mark for the deepest part is when the western summit of some flat-topped land at the back of Oyster harbour is a little open of the rocks off the east side of the entrance. After the bar is passed, the channel is deepest when the centre of the flat land is kept midway between the points of entrance, avoiding a spit of rocks that projects from the rocky point at the west end of the watering beach. The strongest winds are from the westward, and therefore bower anchors should be placed to the S.W. and N.W. ; warps, and the stream cable, will be sufficient to secure her from easterly winds, as the hills rise immediately over the vessel on that shore. As the rise and fall of tide on the bar is very irregular, a vessel going in should pay great attention to the depth, if her draught is more than 10 feet, for it sometimes rises suddenly 2 feet.

Water is procured at Princess Royal and Oyster harbours, by digging holes at the edge of the sand under the hills. At the latter place, however, there is a small stream running over the beach into the sea, in the first sandy bay to the eastward of the entrance of the harbour. The banks that occupy a considerable portion of both harbours afford abundance of oysters and other shell fish ; and fish are to be procured in plenty with hook and line.

TIDES.—According to Captain P. P. King, it is high water in Oyster harbour, full and change, at 10h. 10m., and springs take place about the third or fourth day after a full or new moon.*

Captain J. L. Stokes says it is high water in Princess Royal harbour, full and change, at 11h. 56m. ; springs rise 1 to 4 feet, and 5 feet with south-easterly winds. The greatest rise observed here by Captain M. Flinders was 3 feet 2 inches, and the least 2 feet 8 inches.† There is no tide stream in the sound ; but it runs with considerable strength in the entrances of both harbours.

REMARKS.—Captain R. Fitzroy, in alluding to an extraordinary degree of local attraction about this place, says,—“ We could not ascertain the amount of variation with any degree of accuracy, until our compasses were placed upon a sandy beach of considerable extent, near the sea. Whenever there was a stone (a kind of granite) near the instruments, they were so much affected as to vary many degrees from the truth, and quite irre-

* Captain King's Australia, vol. ii., Appendix, p. 379.

† Captain Flinders' Terra Australis, vol. i., p. 71.

gularly ; those on board were not influenced, at least not more than a degree.”*

MOUNT GARDNER and CAPE VANCOUVER.—Mount Gardner is a high and rather peaked mass of granite, partially covered with a very thin coat of vegetation, and bears N.E. by E. from, and in line with Bald head and the Eclipse isles, distant 10 miles from the former ; it is visible at about 50 miles in clear weather, and descends to a steep rocky shore on three sides ; cape Vancouver, which has a small islet close off it, and is the most prominent point, bears S.S.E. $\frac{1}{4}$ E., distant $1\frac{1}{2}$ miles from the summit.

An island is placed in the French charts, near the shore on the east side of mount Gardner, with a reef extending nearly half a mile from it in an easterly direction, close to the extremity of which there are 13 fathoms.

ROCKY ISLET, which is elevated, and about half a mile long, lies S.W. 2 miles from mount Gardner, and has reefs extending a short distance from its east and west ends.

From abreast of a rocky islet, which lies close off the south-west point of the shore, under mount Gardner, the coast trends N.W. by N. $1\frac{1}{2}$ miles, and then 7 miles westward to the projecting point North of Michaelmas island, forming a long bay, with a rocky and sandy shore, off which there are two more islets similar to those just noticed, one lying $1\frac{1}{2}$ and the other $3\frac{1}{2}$ miles from mount Gardner.

The north shore of King George sound, from the projecting point North of Michaelmas island, trends in a W.N.W. direction $4\frac{1}{2}$ miles to the entrance of Oyster harbour. On the west side of the point there is a bay $1\frac{1}{4}$ miles wide, off the western extreme of which is North Flat rock, lying N.W. $\frac{1}{2}$ W. $2\frac{1}{2}$ miles from Michaelmas island, and one quarter of a mile from the shore.

PORT TWO-PEOPLE, in the French chart of M. Freycinet, is a small sandy bay round the north side of mount Gardner, well sheltered from all westerly winds, but open to the eastward, and from its confined size is adapted only for small vessels : it is about 2 miles in depth, with an entrance 1 mile wide, on the south side of which, near the shore, lies a small rocky islet, with a covered rock at half a mile to the eastward. In the south part of the port there is a larger islet, apparently connected with the shore by a reef, which also extends off its east side, with 6 fathoms between the islet and the south entrance point, from which it is distant nearly a half mile : in its vicinity there are 5 fathoms at a quarter of a mile

* *Voyages of Adventure and Beagle*, Captain Robert Fitz-Roy, R.N., vol. ii., p. 625.

from the beach, increasing to 10 and 13 fathoms near the northern shore, which appears very steep. There are extensive freshwater swamps at a small distance behind the beach, the most accessible part of which for boats, is on the south-west side of the rocky islet, which partially protects them from the swell.

To the eastward of the north entrance point of Port Two-people there is a small bay open to the S.E., in which the depths are too small and irregular to constitute safe anchorage. At 5 miles farther, in an E.N.E. direction, is the entrance of a small winding creek, capable of affording shelter to boats, having 6 fathoms in its entrance of 2 cables width, which generally decreases to its termination at less than a mile from the sea.

MOUNT MANYPEAK.—Hereabouts the land rises boldly to a considerable height, and trends to the eastward, with a sandy shore at the foot of a mountainous range, which, from the number of peaked rocky masses that form its summit, is called mount Manypeak ; the highest and most remarkable peaks being near the west end.

STIRLING RANGE consists of high rugged mountains, bearing about N. $\frac{1}{2}$ E., distant 30 miles from mount Manypeak, rising abruptly from moderately elevated land, and are visible 60 miles, in clear weather. There are several other elevated ranges of similar aspect detached to the N.W. of Stirling range, and also rise abruptly from the moderately elevated land by which they are surrounded ; one of these resembles a dome surmounted by a pinnacle, and is a remarkable object from the S.E., when the atmosphere is clear.

BALD ISLE is a barren rock of moderate elevation, about $2\frac{1}{2}$ miles long, N.W. by W. and S.E. by E., with a peaked summit, bearing E. by N. $\frac{3}{4}$ N., distant 15 miles from mount Gardner, and visible 25 miles from a ship's deck, in clear weather. The island lies off a rocky point of land that falls down from the east end of mount Manypeak, and forms the east side of a channel about a mile wide, in which is a sunken rock ; but Captain Flinders passed through, and had not less than 17 fathoms water. A covered rock, on which the sea breaks only at times, lies in a S. by W. direction about a mile from the south point ; and a small rock, with breakers extending from it, lies near the north-east side of Bald isle. Two small rocky islets lie W. by S. 5 miles from the south point of the island, and 2 miles from the main-land ; they are surrounded by a reef, the southern and larger islet bearing from the other S. by E. $\frac{1}{2}$ E.

The French chart of D'Entrecasteaux places a covered rock on the parallel of the two rocky islets, and bearing S. by W. from the point inside Bald isle ; but Captain Flinders passed very close to this position of the supposed danger without seeing it, nor were any breakers seen in that

direction while passing at a greater distance, in H.M.S. *Mermaid*; but a sunken rock is said to lie about $2\frac{1}{2}$ miles off the south-eastern point of the island.

CAPE RICHE.—To the eastward of mount Manypeak a low sandy shore trends in a bight to the North and north-eastward 21 miles to cape Riche, a cliffy projection, of level appearance and moderate elevation, bearing N.E. $\frac{1}{4}$ E., distant 20 miles from Bald isle. Two small rocks lie near the shore at 3 or 4 miles to the south-westward of it, and a covered reef, on which there is said to be not less than 3 fathoms, rises up in deep water, about S.S.E. $3\frac{1}{2}$ miles from the extremity of the cape. As the sea has seldom been seen to break on this danger, it is considered to be of small extent, but is very little known.

HAUL-OFF ROCK.—S.W. $\frac{1}{2}$ W. 5 or 6 miles from cape Riche, and about a mile from the main-land, is a conspicuous lump of granite, with a smaller rock close to its south-west end. There are 20 fathoms water at a mile to the southward of Haul-off rock, from whence the soundings gradually increase to 45 fathoms at about 20 miles to the south-eastward.

Supplies.—Abreast of Haul-off rock, the shore begins to rise towards cape Riche, round the north side of which it forms a sandy bight, containing Cheyne isle, where whalers occasionally anchor, and from whence farm produce is frequently sent to King George sound by settlers at cape Riche.

From cape Riche the coast trends north-eastward 14 miles, to the bottom of a deep bay, round some cliffy land, that probably affords shelter from south-west winds; this bight has not been perfectly examined, but may be known by the land on its west side being cliffy, and that to the eastward almost bare sand-hills, extending about 17 miles in a S.E. by E. $\frac{1}{2}$ E. direction to cape Knob.

CAPE KNOB is a rugged stony projection, extending East and West about 3 miles, with a sandy bight on each side; that to the eastward containing a small rocky islet. The middle stony lump on the summit of this cape is in lat. $34^{\circ} 31' 30''$ S., long. $119^{\circ} 14' 30''$ E.; and at 3 miles to the southward of it there are soundings in 40 fathoms.

SMOOTH ROCKS, which are three in number and bare of vegetation, lie close to each other near the shore, W.N.W. 4 miles from cape Knob: they are large and are conspicuous objects against the main-land abreast of them, which is little else than bare sand. A small rock very little above the surface of the water, and about the size of a large boat, lies S.E. by E. $2\frac{1}{2}$ miles from the largest of the Smooth rocks, and about W. $\frac{1}{4}$ S. $2\frac{1}{4}$ miles from the south-west extremity of cape Knob.

HOOD POINT, N.E. by E. $\frac{1}{2}$ E. 17 miles from cape Knob, projects in an E. by N. direction about 6 miles from the coast line, and makes like an island, it being connected with the main by low sandy land. Between its cliffy extremity and cape Knob are two deep sandy bights in the coast, with a moderately high projection between them, and an islet near the shore on its north-east side.

DOUBTFUL ISLES, which are four in number, and lie close off Hood point, are rocky and steep; having a good channel nearly a mile wide between the two outermost, which lie 2 miles from the point, and another closer to it. Captain Flinders passed through this channel in H.M.S. *Investigator*, carrying 20 to 24 fathoms water, which afterwards shoaled to 15 and 12 fathoms as he hauled close round their north side into Doubtful Island bay.

He had $7\frac{1}{2}$ fathoms, sandy bottom, at a cable's length from the shore, 2 miles within Hood point; but in the narrow channel between the inner island and the point, his boat found only 2 fathoms. There is a clear passage, nearly 2 miles wide, between the point and the northernmost island. This islet is composed of sand and rock, and is frequented by seals. At 2 miles to the eastward of these islands there are 35 and 38 fathoms, and at 6 miles N.E. of them 33 fathoms; the soundings being irregular, and apparently deep close to the shore.

DOUBTFUL ISLAND BAY.—On the north side of Hood point the land trends West 5 or 6 miles, and then turns to the northward, forming Doubtful Island bay, which is about 19 miles across, N. by E. $\frac{1}{2}$ E., from Hood point to the foot of Middle Mount Barren, and 9 or 10 miles deep, affording shelter in its south-west part from all winds that do not blow hard between N.N.E. and East; its north and western shores have not been closely examined, but are composed of sandy and rocky land, with some barren-peaked hills rising to a considerable elevation, at a small distance from the sea.

MOUNTS BARREN.—West Mount Barren, the south-westernmost of these hills, bears N.W. by N., distant 12 miles from the largest Doubtful isle, and is visible at the distance of 30 miles. Middle Mount Barren is the summit of some steep rocky land, forming the northern extreme of Doubtful Island bay, and is visible 35 miles off.

East Mount Barren, E. by N. $\frac{3}{4}$ N. 17 miles from the Middle mount, is a third rocky hill of similar aspect, but more elevated than the others, with high land stretching to the north-westward, and is visible 40 miles from a ship's deck.

The shore between Middle and East Mounts Barren is high and rocky, with 31 to 34 fathoms at 4 or 5 miles from it; a small Red islet lies close to a projection 5 miles to the eastward of the Middle mount, between

which and East Mount Barren there are two inconsiderable bights open to the S.E., and another bight open to the southward, immediately under the mount.

From East Mount Barren the coast becomes low and sandy for about 20 miles in an easterly direction, and then trends E. by N. $\frac{1}{2}$ N. 24 miles to the bottom of a sandy bight, preserving the same aspect, with sand-hills here and there at the back ; and is fronted by covered and dry rocks, that lie from 5 to nearly 15 miles off the land, with passages among them. From the sandy bight the coast extends E. by S. $\frac{1}{2}$ S. about 18 miles to Shoal cape.

DANGERS EAST of MOUNTS BARREN.—The westernmost of the dangers known to exist off this part of the coast, is a small covered rock, 7 or 8 miles off shore, bearing from East Mount Barren nearly S.E. by S., distant 12 miles, with 25 fathoms in-shore of it, but no bottom with 44 fathoms at 2 miles to the southward ; the sea breaks on this danger only at times. At about E.N.E. 5 miles from the danger just described, there is another of greater extent, on which the sea breaks high ; caution and a good look-out are therefore requisite in navigating this part of the coast, as the soundings give no intimation of the vicinity of these dangers, many of which are several feet below the surface of the sea, and are only occasionally to be discerned in rough weather.

A small low rocky island of smooth and sterile aspect, and frequented by seals in 1802, lies S.E. by E. $\frac{1}{2}$ E. 25 miles from East Mount Barren. Breakers extend North and N.N.E. from it, more than half-way to the main-land, which is 8 or 9 miles distant, and appears to be fronted by other breakers approaching so near the former as to render the existence of a safe channel between them very doubtful ; it is otherwise very steep, with soundings in 38 fathoms between the island and a small reef lying W. by S. 2 or 3 miles from it, and 35 fathoms at 3 miles to the eastward ; but there is no bottom at that depth at a mile off its south side.

ROCKY ISLETS.—A cluster of four small rocky islets lies East 21 miles from the last mentioned isle, with 34 fathoms half-way towards the low and sandy main-land, which is distant 13 or 14 miles from them ; the northernmost islet is the largest, and the whole are surrounded with breakers that appear to extend farthest off their south-west end. A small detached breaker is laid down in the charts of Flinders and D'Entrecasteaux, at N.E. by E. $\frac{1}{2}$ E. between 2 and 3 miles from the body of the group.

The soundings decrease eastward from 35 to 23 fathoms, at 5 miles North of this detached danger, which renders it probable there may be other covered rocks in its vicinity ; and it may be necessary to remark, that the total absence of information relative to the south side of this cluster, renders great caution necessary in approaching them in that direction.

SHOAL CAPE, nearly East 60 miles from East Mount Barren, is composed of sand-hills, forming like white cliffs, and has an islet, surrounded with much broken water, close to its south-east side. The appearance of an opening in the land, on each side of this cape, was observed by Captain Flinders, while passing in 33 fathoms, at 5 or 6 miles off, but was thought to be a low connexion between the sand-hills, with probably lagoons behind them, which occasionally force a passage.

From Shoal cape the coast trends about E. $\frac{3}{4}$ S. 27 miles to the west point of Esperance bay: at 20 miles from the cape is a small piece of land, apparently not joined to the main, but surrounded with breakers, and having a small dry rock on its east side: to the westward of this the coast forms two or three open sandy bays, destitute of shelter; and to the eastward an open bight, off the eastern part of which are some dry and sunken rocks.

RED ISLET, E. $\frac{1}{2}$ S. 7 miles from Shoal cape, lies off the first of these bays, and nearly 2 miles from the main-land. At 6 or 7 miles to the southward of Red islet the soundings are irregular from 25 to 42 fathoms, and become deeper as the islands to the eastward are approached.

ARCHIPELAGO OF THE RECHERCHE, AND ADJACENT COAST.

The Archipelago of the Recherche commences abreast this part of the coast, and extends about 123 miles from the western island of the West group, in lat. $34^{\circ} 2' S.$, long. $121^{\circ} 35' E.$, to the northern rock of the Eastern group, in lat. $33^{\circ} 43' S.$, long. $124^{\circ} 4' E.$; but to give a minute description of every island and reef in this dangerous labyrinth, would be both impracticable and useless; a notice of its most remarkable and detached objects must therefore suffice, with a description of the coast, and Flinders' chart, to conduct any navigator who, from choice or necessity, may happen to encounter them. They should be avoided by a vessel beating to the westward, on account of the haze that is frequently found to prevail among them, and in the neighbourhood of the small detached reefs in the south-west part, which lie 15 or 18 miles from any neighbouring islands.*

TERMINATION ISLAND, in lat. $34^{\circ} 30' S.$, long. $121^{\circ} 58' E.$, is the south-westernmost island of the Recherche archipelago, and is little else but a

* See Plan on Chart of Australia, South Coast, Sheet 1, Cape Leeuwin to Cape Arid, No. 1,059; scale, $m = 0.2$ of an inch. From the result of the observations, it appears the islands of this Archipelago possess a considerable degree of magnetic attraction.—*Flinders*, vol. i., p. 85.

smooth mass of rock, rising gradually to rather a peaked summit, visible 27 or 30 miles from a ship's deck, in clear weather; a small rock, surrounded with breakers, lies half a mile off its north end. Soundings in 62 fathoms, white sand, were obtained 6 or 7 miles to the S.W.; and in 72 fathoms, coral, about W. by S. $\frac{1}{2}$ S. 50 miles from this island; but farther South they are quickly lost.

THE TWIN ROCKS, two small lumps of reddish appearance, lying N.E. by E. $\frac{3}{4}$ E. 13 miles from Termination island, are conspicuous objects on a reef which extends about a mile all round them, with deep water close to its edge.

There is a small reef, with two rocks above water, laid down in the French charts, bearing nearly N.W. $\frac{3}{4}$ W., distant $16\frac{1}{2}$ miles from Termination island; and a dry rock surrounded with breakers lies N.N.W. $\frac{1}{4}$ W. 12 miles from the island. At half-way between the former and the western island of West group there is another reef, with two dry rocks on it, seen both by Captain Flinders and the French.

THE CAUSEWAY is a chain of reefs projecting westward to about 4 or 5 miles north-eastward of the last-mentioned reef, from a great number of islands that front cape Le Grand, which lies East 24 miles from the south-west isle of the West group.

The islands and reefs just described, are the south-westernmost dangers of the Archipelago that are known to exist; and within their limits the chart of Flinders must be consulted for many dry and covered reefs with which the sea is studded towards the main-land.

WEST GROUP consists of three principal islands, lying from 7 to 10 miles from the main-land, and occupying a space of 5 or 6 miles in an E.N.E. and W.S.W. direction, with several small islets and breakers scattered among them. The south-westernmost is the largest of the cluster, with a small hill on its north and south ends; the whole being rocky and moderately elevated, with 46 to 48 fathoms at less than 2 miles from their south side, and a safe passage to the northward.

SUNK ROCK.—A small sunken rock lies East 4 miles from the middle island of West group, with soundings in 40 to 30 fathoms between it and the great number of high rocky islets already noticed as fronting cape Le Grand, to the eastward.

OBSERVATORY ISLE, 6 or 7 miles to the north-eastward of the nearest of the West group, is about $1\frac{1}{2}$ miles long, N.W. and S.E., and lies close to the southward of a point on the main-land that forms the west side of Esperance bay. There is a passage all round the island; and between its north-east side and some covered and dry rocks at a mile to the eastward, the French ships under Admiral D'Entrecasteaux anchored in 23 fathoms, fine sand, at half a mile from the shore, having the main-land to the North,

and the numerous islands fronting cape Le Grand, at about 9 miles to the south-eastward. But this confined anchorage can by no means be recommended, even for a night, unless in very fine weather, on account of the strong winds that frequently blow in the neighbourhood, and which obliged the French ships to ride with three anchors ahead, in order to prevent being driven on shore.*

Fresh water could not be procured in the neighbourhood of this anchorage, in the month of December, but extensive salt lagoons were found to occupy that part of the main immediately behind it ; and the whole country, as well as the islands, proved rocky and sterile.

ESPERANCE BAY extends from the point abreast of Observatory isle, S.E. by E. $\frac{3}{4}$ E. nearly 17 miles to cape Le Grand, and is 9 miles deep, but is filled with so many rocky islands and reefs both above and below the water's surface, that its utility as a place of anchorage is very doubtful. In its north and south-eastern parts, good shelter from south-west and southerly winds may probably be afforded by the numerous islands and reefs in those directions ; but the shores of the bay have not been minutely explored, and should be approached with caution.

CAPE LE GRAND, in lat. $34^{\circ} 1'$ S. long. $122^{\circ} 4'$ E., which forms the south-eastern point of Esperance bay, projects 4 or 5 miles into the sea in a W.S.W. direction, towards the chain of high rocky islets already noticed, that extends southward from the bight of Esperance bay, having among them many narrow channels with deep water, and forming part of the Recherche archipelago. Near the shore, in the south-east corner of the bay, and N.E. by E. 5 miles from the extremity of the cape, is a high peak, visible 40 miles, with a smaller hill between them ; inland from this peak the country is represented to be sandy and barren. No dangers are known to exist immediately off this cape, except a small rocky islet about a mile to the S.S.E., and a smaller islet at a mile to the eastward of the former.

REMARK ISLET, S.W. by W. $\frac{1}{4}$ W. 7 miles from cape Le Grand, is situated near the centre of the group of islands off the cape, and although small, is rendered more remarkable than the others by a high round summit, to which the islet owes its name. Small islands, interspersed with numerous reefs, extend 8 miles southward and south-eastward from Remark islet ; and the chart shows two more remote patches than the others, one bearing S. by W. $\frac{1}{2}$ W., distant 11 miles, and the other S. by E. $\frac{1}{2}$ E. 12 miles from the islet, the latter patch having two rocks above water.

* Voyage de D'Entrecasteaux, vol. i., p. 181.

From cape Le Grand the coast trends eastward 6 miles to a point separating a small bay, fronted by four dry rocks, from Thistle cove, on the east side of the point. At midway between the cape and the point, and 1 mile from the shore, lies a small island with a dry rock and some breakers at S.S.E. 1 mile from it, and several dry rocks lie near the shore between the island and the cape. In approaching Thistle cove a look-out must be kept for a small sunken rock, on which the sea breaks only at times, bearing nearly S. $\frac{1}{4}$ E., distant 1 mile from the west point of the cove.

THISTLE COVE, which may be known by its lying S.E. 3 miles from the high peak over cape Le Grand, is little more than half a mile in extent either way, but it has 10 fathoms in its entrance, 7 fathoms in the north-east part, and it affords complete shelter in its western corner, where a single vessel may be placed in perfect security, with anchors out on the off bow and quarter, and hawsers on the other side fast to the shore. She would thus lie in from 3 to 5 fathoms water, almost near enough to lay a stage to the beach. This is much superior to Lucky bay, to the eastward, where neither wood nor water can be procured without much time and trouble, nor is the shelter so complete ; but Thistle cove is too small to be entered in a gale of wind.

Wood and Water. — There is wood for fuel, though in no great abundance ; and at less than 100 yards from the shore is a lake of fresh water a mile in circumference, from which a small stream runs into the cove ; but another stream descending from the hills nearer into the western corner, would better suit the purposes of a ship.

LUCKY BAY, which is separated from Thistle cove by a small projection nearly a mile across, may be known by its lying North nearly 8 miles from the high Mondrain isle, and $2\frac{1}{2}$ miles westward of the east point of the land of cape Le Grand. At South a little more than a mile from the east point of the bay, are two small islands, between which is a clear channel 1 mile wide, with 20 fathoms water, and 35 fathoms between the islands and the point. The bay is about a mile in extent, and afforded anchorage to the *Investigator* in its north-east part, in January 1802, but it is open to the S.W., in which direction the numerous isles and reefs in the offing are 8 miles and more distant. The north-west part of the bay is shoal, but in the entrance the depth is 17 fathoms, which decreases gradually towards the sandy beach at its head, where wood and water are procurable, though not with so great facility as in Thistle cove. Between Lucky bay and the east point of the land of cape Le Grand are numerous islets and rocks, which extend 5 or 6 miles south-eastward from the coast.

MONDRAIN ISLAND, one of the largest in the archipelago, and visible 30 miles, is upwards of 3 miles long, North and South, and $1\frac{1}{2}$ miles wide ; with breakers surrounding two rocky islets near its west side, and other breakers extending about a mile, perhaps farther, off its south point. There is also a detached reef nearly 2 miles from the north point of the island, with 25 to 30 fathoms on three sides of it ; and 19 fathoms between it and the point. The chart shows an islet with reefs projecting from its north-east and west sides, lying W. by N. 2 miles, and another islet W. $\frac{1}{2}$ S. 4 miles from the south point of Mondrain island, with a sunken rock at 2 miles to the north-westward of the latter. This island was considered by Captain Flinders not to afford secure anchorage ; and a vessel seeking it there, should look out for a reef running a little way from a small islet off the north-east side.

At 3 or 4 miles off the east side of Mondrain island lie two clusters of covered and dry rocks, with 25 and 26 fathoms between them, by borrowing towards the northern cluster, in a channel $1\frac{1}{2}$ miles wide : but other covered reefs exist to the S.E. of this channel, towards Draper isle, and the chart shows two islets lying close together S.E. $\frac{1}{4}$ E. 7 miles from the summit of Mondrain island.

DRAPER ISLE, E. by S. $\frac{3}{4}$ S. 13 miles from the summit of Mondrain island, is an elevated mass of rock, with a dry rock and breakers about a mile off its north-east end.

At N.E. by E. $\frac{3}{4}$ E. 9 miles from Draper isle, a small sunken rock is laid down in the French chart ; which position is nearly equidistant at 6 or 7 miles from three small islands to the N.W. by W. $\frac{3}{4}$ W., N. E. by N., and E. by N. $\frac{1}{2}$ N., having apparently clear channels and deep water among them ; but another sunken rock is shown on the chart to lie S.W. by W. $\frac{3}{4}$ W. 3 miles from the westernmost, and a reef at 2 miles to the southward of the easternmost of the three small islets. This small sunken rock not having been seen by Captain Flinders, who passed in the *Investigator* at 6 or 7 miles to the northward, it is probable the sea does not at all times break over it.

SUNKEN DANGERS.—A small sunken patch lies E. by S. $\frac{3}{4}$ S. 19 miles from Draper isle, and is the more dangerous from the sea only breaking on it at times, and when the water is smooth, perhaps, not at all. But to the southward of Draper isle, between the Twin rocks and the patch, the sea is apparently clear.

Another patch of a similar kind, but smaller, was seen by Captain Flinders, N.E. by N. 6 or 7 miles from the former, and must have been passed very close by Admiral D'Entrecasteaux, in 1792, without being seen.

Although there appears to be a clear sea also between the latter patch

and the north extreme of South-east isles, E. $\frac{1}{4}$ S. 28 miles from it, the existence of these insidious dangers, and probably of more in their vicinity, renders it advisable for a vessel making a passage not to go to the northward of a line from Termination isle, E. $\frac{1}{4}$ N. 72 miles, to south extreme of South-east isles.

To the eastward of the east point of the land of cape Le Grand, the low sandy shore forms a bay 4 or 5 miles deep, extending from the point E. $\frac{3}{4}$ N. 11 miles. In the western part of this bay is a bight with numerous islets and rocks off it, and between two clusters of these islets there are soundings in 10 fathoms, at 2 miles from the main-land, towards which the depth gradually decreases to 4 fathoms at half a mile from the beach. According to Flinders' chart, this bight appears calculated to give complete shelter from all westerly and northerly winds, and is defended to the eastward and southward by small islands and reefs, both contiguous and in the offing ; but the passage to this anchorage lies among numerous dry and covered rocks, which are very little known. There are also several small islets and rocks in the eastern part of the bay, largest and most distant from the shore, being Station islet, which lies 4 miles to the westward of its east point.

CAPE ARID, in lat. 34° S., long. $123^{\circ} 7'$ to $123^{\circ} 13'$ E., is high, sterile, and rises to rather a peaked summit, that projects 6 or 7 miles from the main-land, to which it is joined by a very low sandy isthmus, forming a large sandy bight on each side : that to the westward, which is 10 miles wide, N.W. $\frac{3}{4}$ W. and S.E. $\frac{3}{4}$ E., and 5 miles deep, has not been distinctly traced, but contains two small islands near its shore. The cape is bordered by many small rocks and breakers, which project nearly a mile from the shore, and off its western extremity there is a detached reef bearing from it S.W. $\frac{2}{3}$ S., distant $1\frac{1}{2}$ miles.*

The coast between the east point of cape Le Grand and cape Arid is sandy and generally low, with higher land on its projecting parts ; the intermediate space, from 10 miles E.N.E. of Mondrain isle to 13 miles westward of the summit of cape Arid, being chiefly occupied by a chain of small rocky islands and dry and covered rocks extending as far as about 7 miles from the shore.

TWIN PEAKS, the most conspicuous of these islands, lie nearly West 18 miles from cape Arid ; they are 2 miles apart, bearing from each other nearly N.E. $\frac{3}{4}$ E. and S.W. $\frac{3}{4}$ W., on separate islands, and are visible 27 miles. On steering to pass to the northward and eastward of the Twin peaks, and the small islands immediately contiguous, the *Investigator* shoaled the

* See Chart of Australia, South Coast, Sheet 2, Cape Arid to Australian bight, No. 1,060 ; scale, $m = 0.08$ of an inch.

water from 30 to 10 fathoms, and then suddenly to 3 fathoms, when the bottom was distinctly seen under the ship ; at this time she was nearly in line with the Twin peaks, at 2 miles from the north-eastern one ; and immediately deepened to 7 fathoms, steering towards the two easternmost islands of this chain, between which were found 20 fathoms, in a channel about three-quarters of a mile wide.

MIDDLE ISLAND, nearly South from cape Arid, is the largest of the Recherche archipelago ; the round hill on its north-west point, which is visible about 22 miles, bearing S. by W. $\frac{1}{2}$ W., distant 7 miles from the summit of cape Arid, and the intermediate space of 5 or 6 miles being strewn with small islands and reefs. Between these and the north-east point of Middle island there is a passage with 16 to 9 fathoms, and from 14 to 20 fathoms are found within a mile of the island on its east and south sides ; the western part having no bottom in 14 fathoms, at a quarter of a mile from its steep rocky shore.

GOOSE ISLE and BAY.—Goose isle, which lies about 1 mile off the north side of Middle island, is small and very rocky, but bold to approach, having deep water close to its shore, except on the south-east side. Goose isle bay is an indentation of the northern side of Middle island, extending from the north-west extreme E. by N. $\frac{1}{2}$ N. $2\frac{1}{2}$ miles to the north point of the island. The bay consists of three sandy beaches separated from each other by rocky points ; between which and Goose isle anchorage may be found on a sandy bottom. Between Goose isle and the middle sandy beach, where the anchorage is contracted, there is a bar with 3 fathoms on its deepest part ; to the westward of which the depth to anchor in is 7 fathoms, in line between the western sandy beach, and the west end of Goose isle, with the north-west point of Middle island W.N.W. ; the bottom of sand and weeds will then be plainly visible under the ship.

On the east side of the bar the anchorage is in 11 and 12 fathoms between the north points of the two islands, at about three-quarters of a mile from each ; but the anchor does not hold so well here as in the former situation, occasioned perhaps by the increased depth of water : there is also a small rock above water, lying a third of a mile from the east side of Goose isle, having 7 fathoms close to it.

Supplies.—Among the tufts of wiry grass on the summit of Goose isle, and on most of the neighbouring isles, a large bird, called the barnacle goose, is to be found during the summer months, and may be easily taken. Fire-wood of small size may be procured on Middle island, in sufficient quantity for the supply of two or three ships ; but no fresh water is to be had, except perhaps during the winter, Captain Flinders having found even the drainings from the hills too salt to be drinkable in

the month of January. Cape Arid appears more likely to afford fresh water, which should be sought in the bight on either side, at the foot of the high land that forms it. During the summer, a great quantity of salt may be obtained from a small lake behind the eastern sandy beach in Goose isle bay.

The TIDES are very weak and inconsiderable in this neighbourhood, and are much influenced by the wind.

DANGERS N.W. of MIDDLE ISLAND.—To the N.W. of Middle island there are several small detached reefs and sunken rocks, the nearest of which lies N.W. $\frac{1}{2}$ N. $1\frac{1}{2}$ miles from the round hill on the north-west point, and does not always show itself. There is a clear passage nearly a mile wide between this and a small dry rock W. $\frac{1}{4}$ S. from it, which has 28 fathoms within half a mile of its north side. Two covered patches lie respectively $1\frac{1}{2}$ and $2\frac{1}{2}$ miles to the westward of the small dry rock.

LOW FLAT ISLES are four in number, extending between 4 and 11 miles westward from Middle island, and surrounded with breakers ; there is also a small rocky island E.S.E. 6 miles from Middle island, with breakers off its west side, and a detached reef at 1 mile from its north-east point.

DOUGLAS ISLE lies S.W. by S. nearly 3 miles from the south-west point of Middle island, with a clear passage between them, and no bottom with 35 fathoms at a mile from the north side of the former island, which is low and rocky, and rises quickly to the summit of steep rocky cliffs, that face to the southward and westward. A deep notch in the middle, over which the sea must break in rough weather, gives it the appearance of two isles near each other ; the eastern half being very rocky and uneven, and entirely without vegetation.

The SOUTH-EAST ISLES of Recherche archipelago lie respectively S.E. $\frac{1}{4}$ E. 21 miles, and S.S.E. $\frac{3}{4}$ E. 25 miles from the summit of cape Arid ; the southern or larger isle, which appears at a distance as two islands lying close together, is about 3 miles in extent N.E. by N. and S.W. by S., and, like Douglas isle, is nearly divided in two by a narrow strip of low land. Breakers lie W. by N. $1\frac{1}{2}$ miles from its north point.

The northern of the South-east isles, which is about 1 mile in extent, lies N. by E. $\frac{3}{4}$ E. nearly 6 miles from the former ; it has not been approached very closely, but was observed by Captain Flinders to have a reef lying 4 or 5 miles from it in a N.E. by E. direction.

In consequence of D'Entrecasteaux's chart placing the southern of these islands 6' more South, and 7' more East than the position assigned to it by Flinders, he considered it probable a third island might exist hereabout ; but Lieutenant P. P. King, H. M. S. *Mermaid*, made these islands from the S. by E. in January 1818, and saw only the two laid down in his chart.

POLLOCK REEF.—This dangerous reef was discovered in 1834, by Captain Pollock, in the merchant barque *Merope*, who describes it as extending 8 or 10 miles East and West, and being about 100 yards broad, with apparently about 2 feet water upon it. The western extremity, upon which alone the sea was breaking when the reef was seen at 7 A.M., is in lat. $34^{\circ} 35'$ S., long. $123^{\circ} 26'$ E., or S. $\frac{1}{4}$ W. 14 miles from the largest of the South-east isles.* Capt. C. R. D. Bethune, H.M.S. *Conway*, in 1838, places it in lat. $34^{\circ} 34'$ S., long. $123^{\circ} 25'$ E., and observes ;—"I steered to make the Pollock reef, and at daylight was 2 miles from it; it breaks heavily over a space of about a quarter of a mile; at North 2 miles from it there are 40 fathoms, sand."†

The Admiralty chart of the Pacific Ocean, sheet 9, No. 2467, shows a doubtful islet off this coast in lat. $38^{\circ} 30'$ S., long. 127° E.

CAPE PASLEY forms a hill that is visible 28 or 30 miles, and bears E. by N., distant 13 miles from cape Arid. A low islet lies 3 miles southward of the cape, with some rocks and breakers extending N.E. nearly 2 miles from the islet, between which and the main-land are soundings in 28 to 34 fathoms, shoaling to the N.E.; but in approaching the cape from Middle island, a look-out must be kept for a small dry rock surrounded with breakers, S.W. by S. nearly 10 miles from the summit of this cape, and about the same distance from that of cape Arid; the rock is very steep-to, having no bottom with 34 fathoms at a mile from its north side.

Between these two very projecting capes there is an extensive sandy bight open to the S.E., which has not been explored, but appears capable of affording shelter from all westerly and northerly winds.

MALCOLM POINT, N.E. $\frac{3}{4}$ E. 14 miles from cape Pasley, is low and sandy, with a dry rock close to its extremity, and a ledge of rocks extending from it upwards of 2 miles to the north-eastward.

The coast between the cape and point forms a slight indentation, fronted by some small islets. In proceeding north-eastward from cape Pasley the depth decreases from 20 to 10 fathoms when passing outside a sunken rock, which lies S.S.E. $2\frac{1}{4}$ miles from Malcolm point, and upon which the sea only breaks at times. From Malcolm point a low sandy shore curves round into a sandy bight 5 miles deep, and extending from the point N.E. 8 miles.

ROUND ISLE is a conspicuous small lump of rock, bearing N.E. by E. $\frac{3}{4}$ E., distant 17 miles from the northern of the South-east isles, and S.E. by E. $\frac{1}{4}$ E. 20 miles from the summit of cape Pasley. Two small rocks lie upwards

* Nautical Magazine, 1835 p. 201.

† Ibid. 1842, p. 232.

of half a mile off its north and north-west sides ; but they are very conspicuous, and are the only dangers known to exist in its vicinity.

The EASTERN GROUP of the Recherche archipelago consists of eight low sterile rocky islets and a rock above water lying from 8 to 16 miles off the north-east point of the deep sandy bight to the northward of Malcolm point, and scattered over an extent of 10 or 12 miles. The southernmost and largest island is 2 miles long, with some vegetation on its surface ; and it resembles the southern island of the West group, in having a hill, that is visible 24 miles, on its north and south ends.

A chain of sunken rocks appears to connect this island with the greater part of the group that extends North 9 miles from it, leaving apparently clear channels between them and the remaining two islands in-shore ; one of these lies from Malcolm point E. by S. $\frac{1}{4}$ S. 11 miles, and the other E. $\frac{1}{2}$ N. 13 or 14 miles, with soundings in 20 to 23 fathoms between them and the main-land.

ASPECT.—A level bank of land commences behind cape Arid, where it bears the appearance of having once formed the sea-shore ; it continues from thence, with a remarkably uniform aspect, nearly E. by N. $\frac{3}{4}$ N. 435 miles, to the head of the Great Australian bight, preserving an elevation of 400 to 600 feet above the level of the sea, and intercepting the mast-head view of the interior country, with the exception of the first 60 miles.

MOUNT RAGGED.—In that space some craggy, barren-looking hills, 15 to 30 miles in the interior, and of considerable elevation, are visible over the bank ; mount Ragged, the most remarkable of them, bearing from Malcolm point N.W. $\frac{3}{4}$ N., distant 27 miles.

The COAST from the north-east point of the sandy bight immediately to the northward of Malcolm point, trends about N.N.E. $\frac{1}{2}$ E., and is low and sandy, without irregularity for 45 miles, when it curves round eastward 22 miles to Culver point.

ISLETS near the COAST.—There are two small islets, with a reef extending more than a mile off their east side, lying N.E. by E. $\frac{3}{4}$ E. 7 miles from the low sandy north-east point of the bight northward of Malcolm point, and about 3 miles from the shore. There are soundings in 18 fathoms about a mile to the S.E. of the breakers, but the water quickly shoals to 6 fathoms at 3 miles to the N.E. of them, and the depths are afterwards variable between 12 and 8 fathoms at 4 or 5 miles from the shore to the northward.

CULVER POINT, nearly N.E. $\frac{1}{4}$ E. 85 miles from the summit of cape Pasley, is the bluff eastern extremity of a range of cliffs of moderate elevation, which commence about 5 miles to the westward of Malcolm point,

where the bank of level land behind that point approaches very near to the water side.

DOVER POINT.—From Culver point these cliffs extend nearly N.E. by E. $\frac{1}{2}$ E. upwards of 80 miles, without any remarkable feature by which one part can be distinguished from another, except on this bearing at 50 miles from Culver point, where a slight projection of the coast to the N.E., forms Dover point.

These cliffs are about 500 feet high ; the upper third part of them is brown, and the lower portion almost white ; each small projection presents the appearance of a steep cape, as it opens out in sailing along ; but before the ship arrives abreast of it, it is lost in the general uniformity of the coast. These two points are exceptions to this general uniformity, but it requires a ship to be near the land before even these are distinguishable.*

SOUNDINGS.—DRY ROCK.—Soundings in 28 to 21 fathoms are found at 4 or 5 miles from the base of these cliffs, and no dangers lie near them, except a small dry rock, N.E. by E. $\frac{1}{2}$ E. 18 miles from Culver point. There are 21 fathoms within a mile of the shore to the N.E. of Dover point ; but the soundings increase to 34 fathoms at 27 miles S.E. of that projection, on a bottom of brown sand mixed with coral and shells.

LOW SANDY POINT.—From Dover point the cliffs curve into a bight, extending E. by N. 50 miles to a low sandy point in lat. $32^{\circ} 22'$ S., long. $126^{\circ} 29'$ E., being the projecting extremity of some sand-hills, only sprinkled with vegetation. Here the soundings are 7 fathoms at 2 and 3 miles off the shore, increasing to 27 fathoms at 12 miles farther South.

From Low Sandy point, the sandy coast, having a level summit, on which there are some shrubs and trees, extends nearly E. by N. 90 miles, to another low point in lat. $32^{\circ} 1'$ S., long. $128^{\circ} 15'$ E., in almost a straight line. The soundings are between 7 and 15 fathoms at 3 to 8 miles off this coast, and are tolerably regular as far as the latter point, at 2 miles to the southward of which there are 5 fathoms, increasing to 25 fathoms at 27 miles in the same direction.

GREAT AUSTRALIAN BIGHT.—The land next trends N.E. 10 miles, and nearly E. by N. $\frac{1}{2}$ N. for 38 miles, and is somewhat higher, but preserves the same sandy aspect until cliffs similar to those about Dover point, and from 400 to 600 feet high, again emerge from the sand-hills, in lat. $31^{\circ} 44'$ S., long. $129^{\circ} 7'$ E., and extend in very nearly a straight line E. $\frac{1}{4}$ N. 80 miles, with soundings in 24 and 27 fathoms at 5 or 6 miles off shore, when the cliffs sweep round E. by N. $\frac{1}{2}$ N. 17, and N.E., $\frac{1}{2}$ E. 9 miles,

* Flinders' Terra Australis, vol. i., p. 23.

and terminate at a sandy beach that forms the head of the Great Australian bight, in lat. $31^{\circ} 29'$ S., long. $131^{\circ} 10'$ E.*

CAPE ADIEU.—From the head of the Great Australian bight a sandy coast, rising gradually as it recedes into the country, trends S.E. by E. $\frac{1}{4}$ E. about 54 miles to cape Adieu, at 2 or 3 miles to the south-eastward of which are two clifly lumps like islands, close to the main-land ; the coast then sweeps round in an E. by S. $\frac{1}{2}$ S. direction, 10 miles to cape Nuyts.

SOUNDINGS.—In crossing the Great Australian bight, at 7 or 8 miles from the land on each side, the *Investigator* had 27 fathoms, coarse sand and shells, and preserved the same depth while tracing the coast, at 6 or 7 miles distance, towards cape Nuyts, until within 26 miles of it.

NUYTS REEFS.—The westernmost of these reefs, which is of considerable size, lies apparently detached at 5 or 6 miles from the shore, bearing West, distant 10 or 11 miles from the two clifly lumps like islands. The land abreast of it is distinguished by two large and remarkable patches of bare sand. There are soundings in 27 fathoms at 6 miles to the N.W. and West of this danger ; but at 2 miles from its south side there is no bottom at 30 fathoms, and the water is deep towards the body of the reefs, lying 9 or 10 miles to the eastward.

These reefs are smaller than that above mentioned, and consist of two clusters, extending 5 or 6 miles in a S. by W. direction from the clifly lumps westward of cape Nuyts. Captain Flinders passed between the clusters in 35 to 24 fathoms water, and observes ;—“ The southernmost patches are 2 or 3 miles in length, and there are large rocks upon them, standing above water ; the northern patches extend 8 miles along the coast, from which they are distant 3 miles ; and on the eastern parts there are also some rocks above water, but there are none upon the western reef.†

MONTENOTE ISLES, placed in the French chart of M. Freycinet in $32^{\circ} 11'$ S. and about $131^{\circ} 48'$ E., at nearly 18 miles off the land abreast of Nuyts reefs, are described as four small low sterile rocks, the largest being to the S.W., with 36 fathoms water at about 17 miles to the S.E. by S. of the isles. These isles were not seen by Captain Flinders, who passed 8 or 9 miles in-shore of the above position of them, in 30 fathoms water, unless they prove to be some of the “ large rocks standing above water,” that were noticed by him on the outer Nuyts reefs ; this appears not at all improbable, as the French ships passed at a great distance from this part of the coast, and took their departure from it before coming abreast of cape Adieu of their chart, off which the isles

* See Chart of Australia, South Coast, Sheet 3, Australian bight to Cape Jervis, with Nuyts archipelago and Port Lincoln, No. 1,061 ; scale, $m = 0.08$ of an inch.

† Captain Flinders' *Terra Australis*, vol. i., p. 99.

are immediately situated. A ship, in passing, had better be certain of avoiding these dangers, by giving cape Nuyts and the land to the westward of it a berth of 20 or 25 miles.*

GEOGRAPHE REEF, said to have been seen in the French corvette of that name in 1802, and laid down in the French chart in lat. $32^{\circ} 40'$ S., long. $132^{\circ} 7'$ E., was sought for without success, by Mr. B. Douglas, Provincial Marine Surveyor of South Australia, in 1858.

YATALA REEF was discovered by Mr. B. Douglas in 1858, in lat. $32^{\circ} 38' 20''$ S., long. $132^{\circ} 33'$ E. ; it is nearly awash, with 32 fathoms at about 2 miles from it. This very dangerous reef should be most carefully avoided, as neither the soundings give any decided warning of its proximity, nor do land-marks enable the navigator to fix his position by bearings, when cloudy weather prevents observations from being taken.

CASUARINA REEF, placed on the French chart in lat. $32^{\circ} 40'$ S., long. $132^{\circ} 56'$ E., and represented as of the same description, but somewhat larger than Geographe reef, was rigidly searched for by Mr. B. Douglas during a most favourable day for the purpose, but no evidence of its existence was discovered.

As Yatala reef lies nearly midway between the assigned positions of Geographe and Casuarina reefs, and nearly on the same parallel of latitude, it is reasonable to presume that Yatala reef is identical with those reported dangers, and that some error in longitude of the French navigators, who reported these reefs, may have occasioned the erroneous positions assigned to them. Nevertheless it is incumbent on all mariners in the vicinity of Yatala reef to be on their guard.

CAPE NUYTS, in lat. $32^{\circ} 2'$ S., long. $132^{\circ} 18'$ E., is the high cliffy extremity of some rocky land that extends 9 miles eastward from the cliffy lumps already noticed. A pyramidal rock lies near the cape ; and to the eastward of it there are two small bights, with a steep rocky projection between them ; but they are both open to the southward, and encumbered with rocks, which appear to front the shore for several miles on each side of the cape.

FOWLER POINT, nearly 10 miles to the eastward of cape Nuyts, is a cliffy projection about 120 feet above the sea level, and half a mile broad, projecting 3 miles south-eastward from the general line of the coast, which is of similar elevation and formed of rocky head-lands and sandy bights. A few rocks lie a short distance off the extremity of the point, and a reef projects nearly three-quarters of a mile from its north-east side.

* Voy. aux Ter. Aust. par M. Freycinet, p. 140.

FOWLER BAY and PORT EYRE.—The bay extends from Fowler point E.N.E. 10 or 12 miles to two cliffy projections appearing at that distance like an island, and which are fronted by breakers. There are 3 and 4 fathoms at about a mile from the beach, in the bight of the bay, the depth increasing to 17 and 18 fathoms towards its steep rocky north-eastern shore.

Port Eyre is a very convenient anchorage in the western bight of Fowler bay, open only to the three points of the compass between S.E. by S. and E.S.E. The colonial schooner *Yatala* anchored here after a very strong wind from E.S.E., but little swell was experienced a roll may however come in on the eastern part of the beach after a continuation of southerly gales; but from information received from coasters, and the appearance of vegetation close to the water's edge, it is improbable that any risk or inconvenience will be experienced in riding out a gale from any quarter in this anchorage.

From seaward the soundings decrease somewhat rapidly from 12 and 13 fathoms towards the shore, but gradually enough to enable a vessel under command to pick up a berth without risk or difficulty.

DIRECTIONS.—In approaching the anchorage in Port Eyre, after clearing the rocks and reef projecting from Fowler point, a berth of one-third of a mile should be given to the coast, to avoid some sunken rocks lying a short distance off the termination of the rocky bank, fronting the sandy beach at the foot of the sloping hills, in the bight.

ANCHORAGE.—The best anchorage will be found in 3 to 4 fathoms, according to the size of the vessel, in about the centre of Port Eyre, with Fowler point S.S.E. to S.E. by S., and the end of the range of sand-hills at the head of the bight, from W. by N. to W.N.W. The bottom is sandy and holds well outside 3 fathoms; under that depth occasional patches of limestone occur, which should be avoided.

The *Yatala* frequently anchored in $2\frac{1}{2}$ fathoms, with Fowler point shut in by the rocky point forming the southern horn of the sandy bay; but vessels should keep outside that line, as, should the wind come from the eastward, there is little room for veering cable or getting under way.

LANDING-PLACES.—The best landing-place is in the north-west corner of the bay; as in the more south-westerly parts there are rocky patches, which are liable to stove a boat, if a surf should be running on the beach.

Water.—Good water may be procured by clearing out some native wells behind the sand-hills at the north-west part of the bay; but care must be taken not to dig too deeply or the substratum of pipe-clay formation may be penetrated, and the water become salt. The most

eligible place, in fine weather, for getting off casks, is at the eastern end of the range of sand-hills, at the foot of which are the wells.

TIDES.—It is high water in Fowler bay, full and change, at 10h. 30m.; ordinary springs rise 6 feet.

The coast from the north-east extreme of Fowler bay trends nearly S.E. by E. 26 miles to Bell point; it is moderately elevated, but barren and sandy, and is divided into three sandy bights by cliffy projections of whitish appearance, fronted by breakers.

SINCLAIR ROCKS.—Off Sinclair point, the south-eastern of these projections, lie the Sinclair rocks, bearing nearly W. by N. between 6 and 10 miles from Bell point: they are four in number and small, with breakers round them, and 7 fathoms on a coral bottom, in the bight to the eastward, at 2 miles from the main-land.

BELL POINT is low, with a small rising near its extremity, and projects considerably from the coast line, having a broad flat rock, surrounded with breakers, at about a mile to the westward of it.*

SOUNDINGS.—Off this part of the coast, the soundings are generally from 30 to 34 fathoms, between 15 and 18 miles off shore, but are not regular; and 20 fathoms are found at 2 or 3 miles from the rocks. They are no guide for approaching the coast; and on account of the Yatala reef, and the doubtful Montenote isles and Géographe and Casuarina reefs (pages 36, 37) represented to have been seen by the French, this part should not be approached in the night, or without keeping a good look-out.

NUYTS ARCHIPELAGO AND ADJACENT COAST.

NUYTS ARCHIPELAGO is contained in a large bight of the main coast between Bell point and Westall point, S.E. $\frac{1}{3}$ E. nearly 60 miles from it: this bight includes several deep bays, and is the eastern extremity of the land of New Holland, discovered by Peter Nuyts, in 1627. The principal islands of this archipelago are St. Peter island, lying near the main-land, with its south-west point E. by S. $\frac{1}{4}$ S., 20 miles from Bell point, and the isles of St. Francis, the largest of which lies S.S.F. 18 miles from the point. Numerous rocks lie scattered amongst these islands, but the water is generally deep close to them, and they are safe to approach except between Bell point and Purdie islets, 4 to 6 miles south-eastward of it, where a sunken rock rises out of 9 fathoms water, upon which the swell does not always break.

* See Plan of Nuyts archipelago on Chart of Australia, South Coast, Sheet 3, No. 1061; scale, $\pi = 0.2$ of an inch.

The ISLES of ST. FRANCIS, the south-westernmost group of Nuyts archipelago, are ten or eleven in number ; but only one of them, which is near the middle of the cluster, is of any considerable size, and it bears the name of the whole. St. Francis isle is about 3 miles long, N.W. and S.E., and half a mile across near the centre, where there is a sandy isthmus, connecting the two moderately high and cliffy extremities, the south-eastern and larger portion of the island being 2 miles across and 244 feet high.

ANCHORAGE.—Petrel bay, on the north-east side of St. Francis isle, affords excellent anchorage in 9 to 10 fathoms, on a clear sandy bottom. The best part of the bay in which to anchor is its western corner, in $8\frac{1}{2}$ fathoms, with the western part of the bay bearing North, where a vessel will swing at a distance of about 2 cables' lengths from the beach. Should, however, the wind be from the northward, and inclined to remain steady in that direction, with any degree of strength, good anchorage will be found, in 7 fathoms, on a sandy ridge running out eastward from the western point of the bay : within this bar, the soundings increase to 10 fathoms, from which they slowly decrease towards the beach. The eastern part of the bay also affords anchorage ; but as the coast is rocky, and that portion of the roadstead more exposed to the swell coming round the western end of the island, it is not recommended.

Four small islets lie from half a mile to 2 miles off the north-east point of St. Francis isle, which are generally safe to approach, with the exception of one of them known as Freeling islet, which has a detached rock lying N.N.W. a short distance from its northern extremity.

There are two islets surrounded by rocks, on the west side of St. Francis isle, the outer islet being distant 1 mile from the west point : as the sea rolls in with great violence on these islets, passing vessels are recommended to give them a wide berth.

Masillon and Fénélon isles lie respectively 2 and 3 miles to the southward of the south point of St. Francis isle : they are both similar in character, but smaller than St. Francis isle ; Masillon isle being 209 feet high, and Fénélon isle much smaller and somewhat lower. A small islet and some rocks lie between the two islands.

Between St. Francis and Masillon isles there is a good channel $1\frac{1}{2}$ miles wide, with 18 and 20 fathoms in it ; the south point of St. Francis isle should however be avoided, as a reef projects a short distance from it, and a small islet of the group lies W.N.W. $1\frac{1}{2}$ miles from the north-west point of Masillon isle.

Supplies.—St. Francis isles generally abound in the sooty petrel and the barnacle goose, and water was found trickling down a ravine near the south-east extreme of St. Francis isle.

TIDES.—It is high water at St. Francis isles, full and change, at noon ; rise 6 feet.

CANNAN REEF, S.S.W. $\frac{1}{4}$ W. $3\frac{1}{2}$ miles from Fénélon isle, is a most dangerous rocky ledge, showing about 20 feet above water ; breakers were also observed on sunken rocks between this island and the reef, vessels should, therefore, on no account attempt to pass to the northward of the reef.

HART ISLET, W $\frac{1}{4}$ S. $4\frac{1}{2}$ miles from Cannan reef, and discovered in 1833 by the Hon. John Hart, late Treasurer of South Australia, is a small rocky islet, between 50 and 60 feet above the level of the sea. It is quite safe to approach from all directions, and is therefore an excellent guide for avoiding Cannan reef during the night, as the islet may be closely borrowed on in passing, and from thence a course shaped towards Petrel bay, should a vessel be bound thither ; or if to Fowler bay, sight Hart islet to the eastward, and shape a direct course for Fowler point.

FRANKLIN ISLES, E. by N. $\frac{1}{4}$ N. between 16 and 21 miles from St. Francis isle, are three in number, the central and westernmost being moderately elevated, and extending together 3 miles E.N.E. and W.S.W. ; they are about two-thirds of a mile broad, and are nearly joined together by a reef partly uncovered. The easternmost isle of the group is a mere pyramidal rock, with a reef about it, and a few straggling rocks lie off the western and south-western extremes of the westernmost island ; but as the sea generally breaks on them, they are easily avoided.

Tolerable anchorage for small craft would be found on the north side, between the two largest islands, were it not for a sunken rocky patch lying in the most eligible spot for bringing up.

Supplies.—As usual with most of the islands of Nuyts archipelago, Franklin isles are much frequented by the sooty petrel and barnacle goose ; but in collecting eggs on these islands, strangers should be careful of the snakes, of which there are great numbers, both large and venomous.

FLINDERS REEF, N.W. $5\frac{1}{2}$ miles from the western extremity of Franklin isles, is of a circular form and nearly half a mile in diameter, with rocks above water ; its position being always marked by the sea rolling on it with great violence.

EVANS ISLE, which lies W. $\frac{1}{2}$ N. $3\frac{1}{2}$ miles from Flinders reef, is about half a mile in extent, with a reef, partly dry, extending half a mile from its south-east extreme, close to which there are 19 and 20 fathoms on a regular bottom, the water deepening to 24 fathoms near Flinders reef. In other directions this island appears safe to approach, and being of considerable elevation, it offers at night, an excellent mark for navigating in this

part of the archipelago ; and in shaping a course for Denial bay to the north-eastward, Evans isle forms a distinguishable object to steer for even in a dark night.

LACY ISLES are two in number, lying N.W. by N. and S.E. by S. nearly 2 miles from each other ; the southern isle, which bears W. by S. $\frac{1}{2}$ S. distant $5\frac{1}{2}$ miles from Evans isle, is of a circular form, about half a mile in diameter. The northern islet is very small, with a dry rock and breakers extending from its east side, and a detached dry rock surrounded with breakers lying S.W. by S. 1 mile from the islet. The south-eastern isle is bold to approach, and has 24 fathoms, broken shells, at 1 mile from its south-west point, and being similar in aspect and elevation to Evans isle, is also a good mark to steer for when shaping a course for Denial bay ; but masters of vessels should be careful in not closing the north-western islet and reefs of the group.

PURDIE ISLES, the north-westernmost of Nuyts archipelago, lie 3 to about 6 miles from the shore to the eastward of Bell point, and consist of one principal isle, somewhat elevated, at S.E. $\frac{1}{2}$ E. $4\frac{1}{2}$ miles from Bell point, with a ledge of rocks, on which there are some smaller islets, extending E.N.E. 3 miles from it. A separate islet also lies eastward 2 miles from the largest isle, and a smaller one at $1\frac{1}{2}$ miles off its south end, to which it is probably joined by a reef extending from each.

SUNKEN ROCK.—The space between Purdie isles and the main-land to the northward, contains the small sunken rock, noticed at page 39, on which the sea breaks only at times, bearing nearly N.N.W., distant $2\frac{1}{2}$ miles from the largest of these isles ; there are 12 and 14 fathoms, at $1\frac{1}{2}$ miles W.S.W. of it, and 9 fathoms close to its south-west side. The French corvette *Géographe* having used this channel in 1803, and passed very close to the southward of the rock without seeing it, there is a probability that other dangers of a similar nature may exist near it ; the navigator should therefore prefer the passage southward of the Purdie group, where from 20 to 30 fathoms, on a regular bottom of coarse sand and shells, were found by the *Investigator* towards the isles of St. Francis and Lacy, and 17 to 20 fathoms between the north-easternmost Purdie islet and Lound islet, at 4 or 5 miles to the eastward of it.

LOUND ISLET and REEF.—The former lies $4\frac{1}{2}$ miles, and the latter $1\frac{1}{2}$ miles, from the main-land to the northward ; midway between the islet and the coast there are 16 and 18 fathoms, on a bottom of coarse sand and shells. The reef, which lies N.N.E. 3 miles from the islet, only shows itself in bad weather, when the sea breaks heavily on it.

From Bell point the coast extends about E. $\frac{1}{2}$ N. 16 miles to Peter point at the entrance of Denial bay, and forms several sandy bights that are

open to the southward; in the centre one of which the French chart places a line of breakers at 2 miles from the shore.

PETER POINT, which is moderately elevated, projects $2\frac{1}{2}$ miles from the line of coast, and is safe to approach from the southward. The point itself is rocky, but on each side the coast recedes with sandy beaches; to the westward is an exposed sandy bay, extending 4 miles to James point; and to the eastward the coast takes a northerly direction, forming the western boundary of Denial bay. At this point numerous fine harbours commence, offering the most secure anchorages and facilities for landing, or even loading and unloading cargoes on the open beaches.

ST. PETER ISLAND, the north-easternmost and largest of Nuyts archipelago, lies near the main-land forming Denial and Smoky bays; it is $7\frac{1}{2}$ miles long, N.E. and S.W., and $3\frac{1}{2}$ miles broad at its south-western part, its north-eastern extremity forming a long, narrow point, projecting 3 or 4 miles from the main body of the island. St. Peter island is of moderate elevation, and on the narrow point, at $2\frac{1}{2}$ miles from its N.E. extremity, rises mount Younghusband, bearing E. by S. $\frac{3}{4}$ S., distant 7 miles from Peter point. This hill may be seen at a considerable distance, and is a useful mark for fixing the position of any vessel navigating in these waters. The western portion of St. Peter island abounds, during the wet season, in vegetation of the most luxuriant description.

ANCHORAGE.—During southerly winds, secure anchorage will be found in 3 fathoms on the northern side of St. Peter island, with mount Younghusband bearing E. by N. $\frac{1}{2}$ N., and Peter point N.W.; but should the wind draw round to the West with any degree of strength, a heavy sea will be experienced, which would render the position of a vessel in that locality somewhat perilous.

A small rock awash at low water, having 2 fathoms close to its north-east side, lies off the low rocky point near the anchorage.

Water will be found near the anchorage, by digging in the sandy bay at the termination of the long sandy beach trending to the westward from the foot of mount Younghusband. It is necessary to dig a few feet in the sand, when the water will be found oozing through the soil. Brackish water, fit for sheep, will be found on the point to the eastward of mount Younghusband.

GOAT ISLE, so named from a few goats having been left on it by whalers, lies off the south-west extreme of St Peter island, from which it is separated by a rocky channel, half a mile wide, but impassable for vessels. Goat isle is about $1\frac{3}{4}$ miles long N.E. and S.W., and three-quarters of a mile broad; its northern and western shores are bold to approach, except where a reef runs out a short distance from its western extreme,

though not so far to seaward as to render it any impediment to the navigator, if using ordinary precaution in approaching a shore on which the sea breaks with considerable violence.

The southern side of Goat isle and the south-west extreme of St. Peter island have several reefs off them, which are above water, and generally show their positions by the sea breaking on them.

ST. PETER ISLAND SHOALS.—From the southern coast of St. Peter island a reef stretches out about 2 miles, and joins the extensive St. Peter Island shoals, the southern edge of which trends N.E. by E. 3 miles from the reef, to a narrow spit stretching E. by S. 4 miles, its extremity bearing E. by S. $\frac{3}{4}$ S., distant nearly 8 miles from mount Younghusband. From this point the edge of these shoals trends nearly W.N.W. $5\frac{1}{2}$ miles, and N.N.E. $2\frac{1}{2}$ miles, to a sand-spit projecting about $1\frac{3}{4}$ miles from the north-east point of St. Peter island.

From the north-western extreme of St. Peter island, its northern shore is fronted by shoals, terminating eastward at the sand-spit off the north-east point of the island, and extending 1 mile to half a mile from the shore. And at 1 mile northward of mount Younghusband, there is a narrow neck between two bights, from whence the northernmost portion of these shoals projects 2 miles to the northward, and from 2 miles north-westward of the mount, extends 4 miles north-eastward to a spit, from which the north-east point of St. Peter island bears S. by E. $\frac{1}{4}$ E., distant 3 miles. The chart shows a small islet on the shoal, at half a mile north-westward of mount Younghusband. As the banks of these northern shoals are steep-to, they should be carefully avoided.

WINDS.—Land and sea breezes are experienced in Nuyts archipelago during the summer months; the sea breeze setting in from the S.E. usually about noon, after a few hours' calm or light winds, and veering at night to the N.E.

TIDES.—There is no tide amongst the islands of Nuyts archipelago worthy of notice, either from its velocity or rise and fall, and the islands lie too much in a bight to be much visited by currents.

DENIAL BAY, which extends from Peter point E. by S. 14 miles to cape D'Estree, is divided into four smaller bays, affording most secure anchorages for loading and discharging cargoes.

TOURVILLE BAY.—The entrance of this bay extends from Peter point N.E. by E. 4 miles to Beaufort point, close off which there appears to be a sunken rock; and from the entrance the bay runs in about 7 miles to the north-westward, forming several small bights and creeks. Tourville bay is mostly occupied by sand or mud-flats, leaving only a channel about half a mile to a quarter of a mile wide, near the south-west side,

carrying from $3\frac{1}{2}$ to 2 fathoms from the entrance to about 4 miles north-westward of it. This channel has a bar at the entrance, on which the soundings are irregular.

DAVENPORT is an opening in the mangroves at N.N.W. 3 miles from Peter point, leading into a creek which runs in nearly 3 miles to the westward. There are only 8 feet at low-water springs, on the bar at the entrance of this creek ; but for any small vessel requiring a refit or water, Davenport will be found a very eligible anchorage. The best and most convenient berth is at about 150 yards above a small mangrove islet on the south-east side, and the deepest water will be found on the south side of the creek ; but, from its narrowness, it is necessary to moor. Soundings of $2\frac{1}{2}$ fathoms at low-water springs, may be carried up about a mile beyond the anchorage recommended, but there is no object in leaving that of the creek, which is nearest the watering place.

DIRECTIONS.—The first available anchorage on entering Denial bay from the westward will be in $3\frac{1}{2}$ fathoms, fine sand, in the entrance of the channel leading into Tourville bay. To enter this channel, after passing Peter point, bring it to bear West, and Beaufort point N.E. $\frac{1}{4}$ N., when the former point will be distant about 1 mile. From this position steer N.N.W. $\frac{3}{4}$ W., keeping a good look-out for the banks on either side, and paying attention to the soundings. As Lound islet is brought in line with Peter point, the soundings will decrease rapidly and become very irregular, until the islet is shut in with the point, when the bottom becomes more even, and a berth may be easily picked up in $3\frac{1}{2}$ fathoms, on a fine sandy bottom, with Peter point bearing S.W., and the Mangrove point at the entrance of Davenport N.W. $\frac{1}{2}$ W.

On proceeding 2 miles farther up this channel a small vessel may proceed over the bar into Davenport. Two sandy spits project beyond the line of the western bank to some extent, but they may be easily avoided by keeping a good look-out from aloft, from whence the discoloured water on the shoals will be readily observed.

After passing the entrance of Davenport, the channel trends more westerly, and becomes shallow, until at length this apparently fine bay terminates in a lagoon, dry at low water : at high water there may possibly be some boat channels in it.

Water, of good quality, may be procured by digging at the foot of some sand-hills, on the coast to the southward of Davenport : a post was placed to mark the position of these wells, from which Peter point bears S.E. by E. $\frac{1}{4}$ E., and Lound islet S.W. $\frac{1}{2}$ S. These wells, called by the natives *Cowie Yalkeena*, must not be dug too deeply, as the water would become salt. A boat may, at high water, go up the creek

near the anchorage, to within one-third of a mile of the wells, but it is difficult to procure more than 200 gallons a day by this mode. If the weather be fine enough to allow a vessel to approach the coast in the bay to the westward of Peter point, and the surf be not too high for landing, water may be procured rapidly.

ASPECT.—In the vicinity of Davenport the land is generally sandy, with abrupt hills of the same substance ; but there are a few flats, with richer soil, between the creek and the coast, which may be fit for cultivation. On the east side of Tourville bay the country appears promising, and good tracts of grass land, affording fine pasturage, were observed ; but from repeated enquiries of the natives, and Mr. Douglas' personal observation, water is evidently scarce.

DIRECTIONS.—On leaving Davenport, and observing the same precaution as when entering, a good mark will be found by keeping a remarkable reddish cliff on St. Peter island S.S.E. until Lound islet opens from Peter point, when all danger will be passed. With Peter point bearing West, distant 1 mile, an E. by N. $\frac{1}{2}$ N. course may, in a small vessel, be shaped for Yatala channel, which leads to Murat bay, the northernmost bight in Denial bay.

BIRD ROCK and SHOALS.—Bird rock is a granite reef lying E. $\frac{1}{2}$ S. 3 miles from Beaufort point, and being awash at high-water springs, a pile of stones surmounted by a beacon was erected on its south-east end. It is situated on the south-east bend of shoals extending W. by S. $1\frac{3}{4}$ miles, N.W. $\frac{1}{2}$ W. $2\frac{1}{4}$ miles, and N. by E. $\frac{1}{2}$ E. $1\frac{1}{2}$ miles from the rock. These shoals, which dry in some places at low water, give perfect shelter to the coast within them.

YATALA CHANNEL, which is bounded to the southward by the north edge of St. Peter Island shoals, and to the northward by Bird Rock shoals, does not exceed half a mile in width, the deepest water is within half a cable's length of Bird rock, where there are 5 fathoms ; on the south side of the channel the water shoals somewhat gradually to 3 fathoms, when the bank is steep-to. The rock being passed the soundings become irregular, but at all times of tide a vessel drawing 12 feet, will be able to find a safe navigable channel to any part of Denial bay, which may be safely approached by paying ordinary attention to the lead.

For large vessels, however, as Yatala channel is somewhat confined, and the water shallow, except at high water, it will be necessary to approach Murat, and the adjacent bays from the southward, by the Waterwitch channel and Smoky bay, to be hereafter described.

NORTH CHANNEL is a narrow passage leading into Murat bay, between Bird Rock shoals and the shoal which borders Beaufort point, by

keeping tolerably near the main-land ; but as it is in some parts very shallow and tortuous, and the south-west swell rolls in heavily at its entrance from seaward, this channel cannot be recommended.

MURAT BAY.—From Beaufort point the coast trends N.E. by N. $2\frac{1}{2}$ miles to an apparently rocky point forming the west side of the entrance of Murat bay, which is $2\frac{3}{4}$ miles wide between the point and cape Thévenard, a long rocky projection, lying E.N.E. $4\frac{1}{4}$ miles from Beaufort point. Between the cape and the north-east point of Bird Rock shoals there is a channel nearly 1 mile wide, with $4\frac{1}{2}$ fathoms, forming the eastern entrance into Murat bay from Yatala channel. Within the entrance the bay expands to $4\frac{1}{2}$ miles in width, East and West, and extends 4 miles northward from Bird Rock shoals, having soundings in 5 to 3 fathoms, and affording secure anchorage for vessels of any tonnage.

Between cape Thévenard and cape Vivonne, S.E. by S. 4 miles from it, is another bay with $5\frac{1}{2}$ to 3 fathoms in it, similar in character to Murat bay, and in which cargoes may be landed, or shipped from the beach, in ordinary weather.

From cape Vivonne the sand-spit off the north-east point of St. Peter island bears S.E. by E., distant two-thirds of a mile, the intermediate channel being about half a mile wide, with 3 fathoms water. A few rocks lie a short distance off the cape, and as the spit is very narrow and steep-to it should be avoided.

DÉCRES BAY extends from cape Vivonne, E.S.E. 4 miles, to a point with rocks close off it, about 4 miles to the eastward of the north-east point of St. Peter island ; this bay, which is $1\frac{1}{2}$ miles deep, has 5 to 3 fathoms in it, and affords very good anchorage for vessels of any class, and being sheltered by St. Peter Island shoals to the south-westward, produce may be shipped from, or cargoes landed on the open beaches without risk or difficulty, in moderate weather.

CAPE D'ESTREE.—From the south-east point of Décres bay the coast trends S.S.E. 2 miles to cape D'Estree, the north-western point of Smoky bay ; this cape is bold to approach, and should be kept within the distance of a mile to avoid the long south-east spit of St. Peter Island shoals, which lies South 2 miles from the cape.

EYRE ISLE, of which the north-west point bears S. by E. $\frac{1}{4}$ E., distant $5\frac{1}{2}$ miles from cape D'Estree, is a mere bank of sand, 4 miles long, W.N.W. and E.S.E., and $1\frac{3}{4}$ miles across at its broadest part, having a few sand-hills on its western coast. Several parts of the island are intersected by muddy creeks, and stunted vegetation clothes its unpromising soil. A smaller isle lies close off the west point of Eyre isle.

EYRE ISLAND SHOALS.—Eyre isle and the islet near its west

point are surrounded by extensive shoals : from a sandy spit projecting $1\frac{1}{2}$ miles from the northern extreme of Eyre isle, the outer edge of these shoals, trends S.W. by S. $3\frac{1}{2}$ miles, and from thence it appears to take a S.E. by E. direction 7 miles to the main-land, at $2\frac{1}{2}$ miles southward of cape Missiessy ; and from the same sandy spit the outer edge extends eastward 3 miles, and then S.E. by S. about 4 miles, to within a mile of the east point of the cape, there joining the flat which fills up the southern bight of Smoky bay.

Between the south-east point of Eyre isle and cape Missiessy, three-quarters of a mile south-eastward of it, is a false channel, having 3 fathoms in its centre ; but there is a bar outside with not more than 6 feet water on its deepest part.

REEFS extend about $2\frac{1}{2}$ miles south-westward from the west point of Eyre Isle shoals, and are mostly above water, but as undiscovered rocks may exist between these reefs and Franklin isles, the passage eastward of these isles is not recommended to strangers.

WATERWITCH CHANNEL, which leads into Smoky bay from the south-westward, offers the best and safest access to the fine harbours already described, and with ordinary care may be made available at all times of tide, and in any kind of weather.

This channel is bounded to the southward by the reefs just noticed, and the north-west and northern edges of Eyre Isle shoals, and to the northward by the long reef running out from the south side of St. Peter island, and the southern edge of St. Peter Island shoals. It is fully 5 miles wide between the reefs off the west point of Eyre Isle shoals and that projecting from St. Peter island, having 5 to 7 fathoms for a width of $3\frac{1}{2}$ miles, and is $1\frac{1}{2}$ miles wide, with 3 to 5 fathoms in the narrowest part, between the sand-spit projecting from Eyre isle and the south-east spit of St. Peter Island shoals, the deepest water in this part of the channel being on the northern side.

DIRECTIONS.—To enter Waterwitch channel from seaward, having brought the western end of the outer Franklin isle to bear South, distant 3 miles, steer N.E. $\frac{1}{2}$ E. for a wooded hill on the main-land ; keep the lead going, and a good look-out from aloft for the south-east spit of St. Peter Island shoals, 2 miles southward of cape D'Estree. Having brought that cape to bear N. by W. all danger will be passed, and a course north-westward may be shaped for Denial bay, or south-eastward for Smoky bay.

Care must be taken to avoid the reefs between Franklin and Eyre isles and Eyre Isle shoals, on the south-east side of the channel, and to give a good berth on the north side, to the long reef and shoals extending from Peter island, as the westernmost of these dangers is exposed to the ocean

swell, which would soon prove fatal to any vessel unfortunate enough to strike on them.

In beating in through Waterwitch channel from seaward, attention to the soundings and a good look-out will be all that is necessary to show the navigator when to tack.

To leave Waterwitch channel, a vessel should be in mid-channel, between the two spits in the eastern entrance, and from thence, if the wind be fair, she should steer south-westward, so as to leave the Franklin isles 2 or 3 miles to the southward.

In working out against a head wind, wait for the ebb stream, which runs out at the rate of about 2 knots, and make short tacks in mid-channel, until the channel widens.

TIDES.—It is high water in Denial bay, full and change, at 5h. ; rise 6 feet.

SMOKY BAY extends nearly S.E. 13 miles from cape D'Estree, and is $3\frac{1}{2}$ miles across from Eyre isle to the main-land, with a clear entrance $1\frac{3}{4}$ miles wide from Décres bay, and 2 miles wide from Waterwitch channel. There is a small shallow inlet in its northern bight, E.N.E. $2\frac{1}{2}$ miles from the cape, and the southern bight is occupied by shoals extending $3\frac{1}{2}$ miles from the shore, and continuing about 2 miles northward along the eastern shore of the bay.

Smoky bay, in which there are $5\frac{1}{2}$ to 3 fathoms water, affords excellent anchorage, according to a vessel's draught, in any portion of its extensive waters, the only caution necessary to observe being a due regard to the lead, which gives most reliable warning in approaching the shoals that border the north-east side of Eyre isle, and extend in some parts, nearly $1\frac{1}{2}$ miles from the shore.

From cape Missiessy, the south point of Smoky bay, the coast trends S. by W. 7 miles to Dillon point, between which and Brown point, 3 miles to the southward of it, is St. Mary bay, a small exposed bight, which, together with the coast 2 or 3 miles farther to the northward, is fronted with breakers. A wide berth should be given to this part of the coast as there is no object in approaching it ; for which reason it has not been minutely surveyed.

BROWN POINT, which forms the north-west extreme of Streaky bay, is a low sandy projection, and has two small rocks close to its extremity, with breakers surrounding them, and extending to those along the shore to the northward. The soundings are 24 fathoms at 2 miles to the westward, and 23 fathoms at 3 miles to the southward of it ; and to the eastward, the water shoals from 9 to 6 fathoms for about 9 miles into Streaky bay.

CAPE BAUER, S.E. $\frac{1}{4}$ E. 15 miles from Brown point, is a cliffy projection of the main-land, forming the south-eastern point of Streaky bay ; breakers extend three-quarters of a mile from the north side of the cape.

OLIVE ISLE, W. $\frac{1}{4}$ S. $4\frac{3}{4}$ miles from cape Bauer, does not exceed a quarter of a mile in diameter, but is 60 feet high ; reefs extend E.N.E. $2\frac{1}{2}$ miles from the isle, and there are dangers at a mile to the southward and westward of it, besides other straggling rocks at a short distance to the northward. Some of the rocks to the eastward of Olive isle are always above water, and tend to show the approximate distance the reef extends from the island ; as, however, the sea almost invariably breaks on these reefs, no prudent seaman need anticipate either difficulty or danger in approaching the island within a reasonable distance.

There is a good passage between the eastern reefs of Olive isle and cape Bauer, having, by borrowing towards the cape, 8 and 9 fathoms, coarse sand, the depth quickly increasing to 23 fathoms southward of the passage. At 2 miles to the westward of the island there are 20 fathoms, and the depth varies between 25 and 34 fathoms at the distance of 15 miles in the same direction. From the rocks and reefs about Olive isle to the centre of Streaky bay the soundings decrease gradually from 20 to 6 fathoms.

STREAKY BAY, the entrance of which, as before stated, extends from Brown point to cape Bauer, is considered one of the finest harbours on this part of the coast, the only dangers to be avoided in approaching the entrance being Olive isle, and the reefs and rocks about it. The bay is 15 miles deep, its eastern or inner portion being protected from seaward by a barrier of sand-banks extending northward and north-westward from the south, to the northern shore of the bay. There are three channels between these banks leading into the spacious harbour within them, which will be easily found by paying attention to the chart.

From cape Bauer the coast trends N.E. $1\frac{1}{4}$ miles to the reef projecting northward from the cape, and from the reef E. $\frac{3}{4}$ S. 7 miles to a long narrow point, forming the east extreme of Gibson peninsula. This, the northern coast of the peninsula, is fronted by a sandy flat, the outer edge of which, from about 2 miles E.N.E. of cape Bauer, extends nearly N.E. by E. 4 miles to its north extreme, which forms the south side of South channel ; from this point the edge of the flat trends S. by E. 2 miles, and then S.E. by E. 3 miles, terminating in a spit that projects half a mile from the east point of Gibson peninsula.

SOUTH CHANNEL is bounded to the southward by the shoals extending from the north side of Gibson peninsula, and to the northward by South sand ; it is only one quarter of a mile wide in the narrowest part, where there is a bar, having only 10 feet water on it.

DIRECTIONS.—In approaching South channel from seaward, after having cleared the reef projecting from the northern part of cape Bauer, stand in so as to shoal the water near the edge of the flat extending from

the north side of Gibson peninsula, being careful not to get too close to the edge of the shoals, and then steer N.E. until the centre of Eba isle—which lies N.E. $\frac{1}{2}$ N. $4\frac{1}{2}$ miles from the east point of the peninsula—bears E. by S., when a course for that island may be steered, keeping the lead going, and a good look-out from aloft to observe the banks, which discolour the water very distinctly.

When the low east point of Gibson peninsula bears S.E. by S. all danger will be passed, and the vessel may anchor in 5 or 6 fathoms, in Spithead, or proceed southward into Blanche port.

SOUTH SAND, which partly dries at low water, and lies between South channel and Dashwood channel to the northward of it, is $6\frac{1}{2}$ miles long, East and West, and 3 miles broad at the centre. Its eastern extreme, which approaches within 2 miles of the main-land, forms a projecting spit, from which the centre of Eba isle bears S.S.E., distant 3 miles, and Perlubie, a remarkable white sand-hill near the coast, E. by N. $\frac{1}{4}$ N. about 2 miles.

DASHWOOD CHANNEL, the safest of the three passages, is bounded to the southward by South sand and to the northward by North sand; it is $1\frac{1}{2}$ miles wide in its narrowest part, and the soundings vary from $3\frac{1}{2}$ to 5 fathoms; a passage, however, having 5 fathoms in it, may be found by paying great attention to the lead.

DIRECTIONS.—Dashwood channel may be easily entered from seaward, by bringing Olive isle to bear S.W. and the extremity of Brown point W. $\frac{3}{4}$ N., when the vessel will be in 4 fathoms. From this position, keeping a good look-out for the discoloured water on the banks, steer E. $\frac{1}{2}$ S. for the sandy shore of the bay; by keeping on this course until Perlubie hill bears E.S.E., the course may be altered to that bearing. On the centre of Eba isle bearing S.S.E., the east spit of South sand will be cleared, and a southerly course may be steered for Spithead or Blanche port. As the spit is very steep-to, it should be carefully avoided.

NORTH SAND, which lies between Dashwood channel and Warburton channel to the north-westward, extends $4\frac{1}{2}$ miles North and South, and nearly the same distance East and West.

COLLINSON POINT, a projection of the north shore of Streaky bay, lies 2 miles eastward of Brown point, and like it, is fronted by rocks on which the sea breaks heavily. The northern shore of the bay from Collinson point curves round north-eastward and eastward to De Mole point, forming Gascoigne bay; from a low point in the bight of which rocks run off half a mile to the south-eastward.

DE MOLE POINT, N.E. by E. $\frac{1}{2}$ E. $5\frac{1}{2}$ miles from Collinson point, is of moderate elevation, having a hummock near it, which at a distance appears like an island, and is a remarkable object on the coast line: rocks

project from the point $1\frac{1}{2}$ miles in a S.S.W. direction, and from thence they extend along shore towards the bight of Gascoigne bay.

From De Mole point the northern shore of Streaky bay trends N.E. $\frac{1}{4}$ N. 3 miles, and from thence $2\frac{1}{2}$ miles eastward to Lindsay point, a low projection, on the east side of which is Acraman creek.

The northern shore of Streaky bay, from De Mole point to about 3 miles eastward of Lindsay point, is fronted by shoals, the outer edge of which from De Mole point curves round eastward about 4 miles, from whence a sand-spit stretches in the same direction 3 miles towards the main-land, and forms the north-west side of Warburton channel. On the north side of this spit, which lies S.E. $3\frac{1}{2}$ miles from Lindsay point, there appears to be a small inlet in the shoals with 5 to 3 fathoms in it.

WARBURTON CHANNEL, the northernmost and widest of the three passages leading into the harbours of Streaky bay, is nearly 2 miles wide between the north-west side of North sand and the sand-spit just described, and has 5 and 6 fathoms in it.

DIRECTIONS.—To enter Warburton channel from seaward, bring cape Bauer to bear South and Collinson point West ; and from this position steer N.E. with a fair wind ; if with a beating wind, the lead will give good warning as the banks on either side are approached. After having brought a remarkable reddish cliffy projection of the coast to bear N.N.E. and having cleared the sand-spit on the north-western side of the channel, the vessel may anchor in 6 to 4 fathoms, or where most convenient, in a spacious roadstead, extending from the North sand N.N.W. 4 miles, and E.N.E. the same distance from the sand-spit on the north-west side of Warburton channel, to the main-land.

ANCHORAGE.—Under shelter of the shoal projecting from Lindsay point there is very good anchorage with all winds, and as a harbour of refuge there is perhaps none more easy of access. On the adjacent coast cargoes could be landed, or produce shipped from the open beach, in ordinary weather, without risk or difficulty.

Between the north-east point of North sand and the main-land there is a channel nearly three-quarters of a mile wide, with 14 feet water, leading in the direction of Perlubie from the spacious roadstead just described to the northward ; but as the eastern point of North sand is very steep, the passage is only fit for small vessels.

From the east side of this channel the eastern shore of Streaky bay trends S.E. by S. $7\frac{1}{2}$ miles to Perlubie, and may be approached in 4 and 5 fathoms within half a mile of the beach. Between this beach and the sand-banks fronting it there is another extensive roadstead, with a uniform depth of 4 to 6 fathoms, into which Dashwood channel leads from the westward.

SPITHEAD.—There is a channel nearly $1\frac{1}{4}$ miles wide, with 6 to $4\frac{1}{2}$ fathoms, between Perlubie and the east spit of South sand, leading from the northward into Spithead, the largest sheltered harbour in Streaky bay, where there are uniform soundings in 5 to 6 fathoms over nearly the whole space. Vessels not intending to enter Blanche port will here find very good anchorage in 5 or 6 fathoms, with Perlubie hill bearing N.E. and the centre of Eba isle from S.E. by E. to East. A vessel in this position will be sheltered from all winds and be in perfect safety, with plenty of room to get under way, with the wind from any quarter.

EBA ISLE is 1 mile long, E.S.E. and W.N.W., and nearly three-quarters of a mile broad; it is of moderate elevation, and lies about one-third of a mile from the east shore of Streaky bay, with which it appears to be connected by sunken rocks; and a rock above water lies about three-quarters of a mile to the southward of the island.

BLANCHE PORT is a deep indentation forming a most secure harbour in the southernmost part of Streaky bay. Its entrance is fully half a mile wide between the eastern shore of the bay and the spit projecting from the low east point of Gibson peninsula; but it is divided into two passages by a small rocky patch, with only 6 feet water on it, lying S.S.E. $\frac{1}{2}$ E. 1 mile from the east point of the peninsula, and East 1 mile from a small perforated rock near the shore, bearing S.S.W. $\frac{1}{2}$ W., distant 1 mile from the point. Between the perforated rock and the point a creek runs into the peninsula $2\frac{1}{2}$ miles in a W.N.W. direction. From the small patch in the entrance the port extends about S.S.W. $3\frac{1}{2}$ miles, and is 2 miles across at its widest part, the depth of water varying from 6 fathoms near the entrance patch to $2\frac{1}{2}$ fathoms at the head of the port.

DIRECTIONS.—To enter Blanche port from Spithead and avoid the dangerous patch in the entrance, bring the northern portion of the sand-hills at Perlumbie in line with the western end of Eba isle, and after having passed between the patch and the eastern shore, keep these marks on, as they lead up the harbour clear of a spit projecting a short distance from the eastern shore.

On this line the course will be S. by W. $\frac{1}{2}$ W., and the soundings will vary from 5 to 4, and in some places to 3 fathoms, on a sandy bottom. The depths on approaching the head of the bay become somewhat irregular, but a good berth may be picked up for a vessel drawing 16 or 17 feet, within about half a mile of the beach: vessels of lighter draught may proceed towards the head of the bay into their own draught of water, within 2 cables' lengths of the shore.

In beating out of Blanche port, the same marks may be used as when entering; but it will rarely happen that a leading wind will have to be

long waited for in ordinary seasons, as the sea breeze generally sets in in the afternoon.

RESCUE from SHIPWRECK.—In the event of a vessel being stranded in or near Streaky bay, and the lives of the crew being in danger, assistance will if possible be rendered from the shore in the following manner, viz. :—

1. A rocket or shot with a thin line attached, will be fired across the vessel ; get the line as soon as possible, and having secured it, let one of the crew be separated from the rest, and, if in the day time, wave his hat or his hand, or a flag or a handkerchief ; or if at night, let a rocket, blue-light or gun be fired ; or let a light be shown over the side of the vessel, and be again concealed, as a signal to those on shore.

2. When one of the men on shore is seen separated from the rest, waving a red flag, or, if at night, show a red light and then conceal it, haul upon the rocket line, which will bring off a tail-block with an endless fall rove through it.

3. Make the tail of the block fast to the mast about 15 feet above the deck, or if the masts are gone, to the highest secure part of the vessel ; and when the tail-block is made fast and the rocket-line is unbent from the whip, let one of the crew, separated from the rest, make the signal required by article 1, as above.

4. As soon as the signal is seen on shore, a hawser will be bent to the whip-line, and will be hauled off to the vessel by those on shore.

5. When the hawser is got on board, make it fast to the same part of the vessel as the tail-block, only about 18 inches higher, taking care that there are no turns of the whip-lines round the hawser.

6. When the hawser is made fast on board, the signal directed by article 1 above is to be repeated.

7. The men on shore will then haul the hawser taut, and by means of the whip-line, will haul off to the vessel a sling, cot, or life-buoy, into which the person to be hauled on shore is to get and be made fast. When he is in and secure one of the crew must be separated from the rest and again signal to the shore as directed in article 1 above. The people on shore will haul the person in the sling to the shore, and when he has landed, will haul back the empty sling to the vessel for others. This operation will be repeated, to and fro, until all persons are hauled ashore from the wrecked vessel.

8. It may sometimes happen that the state of the weather and condition of the vessel will not admit of a hawser being set up, in which case a sling or life-buoy will be hauled off instead, and the person to be rescued will be hauled through the surf, instead of along the hawser.

Masters and crews of wrecked vessels should bear in mind that the success in landing them may in great measure depend upon their *coolness and attention to the rules here laid down*; and that by attending to them many lives are annually saved by the rocket apparatus on the coasts of the United Kingdom.

The system of signalling must be strictly adhered to; and all women, passengers, and helpless persons should be landed before the crew of the vessel.

Commanders of vessels who may unfortunately require the aid afforded by the rocket apparatus, in the event of shipwreck, are earnestly requested not to haul on the rocket-line until the party on shore makes the signal, that the tail-block and whip-line are bent on, when the proper response should be made and the tail-block and line hauled on board.

Water.—Supplies.—An abundant supply of excellent water may be obtained at Perlubie, in the hollow of the sand-hills, within 150 yards of low water mark. It is necessary to clear out the wells to obtain a supply, but care should be taken not to dig too deeply, so as to penetrate a clayey substratum which holds the water.

At high water, by means of a hose, casks may be filled in the boats, as the shore is generally free from surf; but at times during strong gales from W.N.W. it may be found difficult to water. From the protection afforded by the sand-banks the ocean swell has quite subsided before reaching this portion of the bay.

Oysters of excellent quality, and unlimited in quantity, may be obtained by taking advantage of the low tides which leave the banks uncovered in some places.

ASPECT.—In the vicinity of Streaky bay the land is of excellent quality; and there is no finer site on the whole coast for a township than the head of Blanche port.

TIDES.—It is high water in Streaky bay, full and change at 1 h.; rise 6 feet.

WESTALL POINT and CORVISART BAY.—Westall point, in lat. $32^{\circ} 53' 30''$ S., long. 134° E., and S. $\frac{1}{4}$ W. 10 miles from cape Bauer, is a bold cliffy head-land somewhat higher than the cape, with rising land towards the interior. The coast from the point trends N.E. $\frac{1}{2}$ E. $2\frac{1}{4}$ miles to a cliffy projection, close off which are some remarkable reddish coloured rocks.

Corvisart bay, which extends from cape Bauer to Westall point, is about $3\frac{1}{2}$ miles deep; it is mostly skirted by a sandy beach, exposed to the westward, but it appears capable of affording shelter from southerly winds, round the north side of Westall point, near the reddish coloured rocks just mentioned; but soundings have not been here obtained, and,

Judging from the bay on either side of these rocks, the water is probably shallow.

SCEALE BAY.—From Westall point Sceale bay extends S.S.E. $\frac{3}{4}$ E. 9 miles to Blanche point, but is only about 2 miles deep ; this bay is also open to the S.W., although coasters report anchorage under some rocks to the south-eastward of Westall point.

CAPE BLANCHE, the south-eastern point of Sceale bay, and which is similar to Westall point, has a sandy bay on each side of it, and a reef of rocks extending from its southern extremity. There are 30 fathoms at 3 or 4 miles from this part of the coast, and the water appears deep close to the rocks.

CAPE RADSTOCK.—From cape Blanche the coast, which is somewhat embayed, takes a south-easterly direction to a point at N.W. $\frac{3}{4}$ W. 4 miles from cape Radstock, a bold cliffy headland in lat. $33^{\circ} 11' 45''$ S., long. $134^{\circ} 15'$ E. This cape, which is of a wedge-like form and 348 feet high, may be distinguished at a considerable distance, and being one of the most remarkable projections on this part of the coast, it is an unmistakeable guide for vessels bound either to Streaky bay, or standing in from seaward towards Venus harbour, to the eastward.

The land to the northward of cape Radstock becomes gradually lower towards cape Blanche, and also for about $2\frac{1}{2}$ miles north-eastward to Beard bay, a shallow inlet barred by rocks and running in north-westward behind cape Radstock.

ANXIOUS BAY, formed between cape Radstock and Waldegrave isles, 30 miles to the south-eastward of it, is 13 miles deep, but is much exposed to all westerly winds, except those to the southward of S.W., and affords no secure anchorage. There are 26 to about 30 fathoms at 3 or 4 miles from its shore in all parts, except the south-east bight of the bay, where there are 7 fathoms on a sandy bottom, at $2\frac{1}{2}$ miles off the beach, and the same depth at half a mile off the north side of the inner and largest Waldegrave isle, which is the easternmost of the Investigator group.

The northern shore of Anxious bay trends from Beard bay E. $\frac{1}{2}$ S. 13 miles to a peninsula, which extends about 4 miles south-eastward to Weyland point, its south extremity. From eastward of Beard bay towards Weyland point the coast gradually increases in height, and from its iron-bound shores presents a most inhospitable aspect ; no outlying dangers, however, were observed, and the soundings between the cape and the point are generally about 30 to 28 fathoms.

WEYLAND POINT is a remarkable cliffy head-land in Anxious bay, similar to cape Radstock, from which it bears E. $\frac{3}{4}$ S., distant 17 miles. It

is 270 feet high, and forms a good mark for making Venus harbour, a small port, the entrance of which lies N.E. nearly 2 miles from the point.

A ROCKY LEDGE lies nearly a quarter of a mile off Weyland point, with deep water round it, on which the sea breaks with great violence in bad weather; but at high water, when the sea is smooth, this danger may be approached without its being perceived.

VENUS HARBOUR.—Between Weyland point and the south-west extreme of a peninsula on the east side, at E.S.E. 3 miles from the point, is an opening in the rocky coast-line leading into Venus harbour. The soundings here rapidly decrease from 20 to 10 fathoms, and then in a few casts, from 4 to 3 fathoms on a rocky bar. The fairway into the harbour is exactly between two head-lands, which are of little elevation, and lie nearly North and South, about 250 yards from each other. There is a rocky ledge on the north-west side of the entrance, in the direction of a small sand-hill on Germain islet, which lies nearly a mile within, and faces the entrance; and from the southern head, which forms the north-west point of the eastern peninsula, another ledge projects a short distance towards the bar.

Venus harbour is 9 miles long, E.S.E. and W.N.W., and nearly 3 miles across at its broadest part, with some small islets in it and several points and sand-spits projecting from the southern shore, which divide the harbour into three branches, all of which are only navigable for boats or small craft at high water.

ANCHORAGE.—There is good anchorage in 3 to 4 fathoms, anywhere within the entrance, the best being between the eastern peninsula and a sand-spit, which divides the channel into two directions, one branch leading to the northward, where it soon becomes shoal, and the other to the eastward, which also gets shallow as it is ascended.

DIRECTIONS.—Provided the weather is moderate and the wind fair, with the flood stream, no vessel of less than 12 feet draught need apprehend danger in running for Venus harbour; and after having passed Weyland point and avoided the rocky ledge off its extremity, a course may be steered for the entrance, when, with a few casts of the lead the soundings will decrease from 20 to 3 fathoms. Having run in between the heads, haul round to the eastward, avoiding the rocky ledge lying in the direction of the sand-hill on Germain islet, and anchor where directed, or as most convenient.

The sand-spits may be easily avoided by keeping a good look-out from aloft; and in entering the harbour with a strong flood stream and fair wind, it will be necessary to get the sail in as soon as possible, as there is very little space between the heads and the anchorage.

No stranger should run for Venus harbour in bad weather or on the ebb,

when there is any swell on the coast, as the whole entrance at such times is a mass of breakers ; neither should an attempt be made to pass the bar with a light or baffling wind, as the least mistake, or loss of command over the vessel, might throw her on the ledge projecting from the southern head towards the bar, from which position it would be quite impossible to rescue the vessel, or in all probability the crew.

A stranger, however, might in moderate weather, approach Weyland point and observe if the sea breaks on the detached reef already mentioned, as lying off that head-land. Should there be no surf there, the bar is practicable with a fair wind and flood stream. In the event of its not being found advisable to attempt the passage, the vessel may be kept off and on ; but it is more safe to proceed at once to the anchorage under Flinders isle, in the south-eastern end of Anxious bay, which is a convenient stopping place to await an opportunity for entering Venus harbour.

To leave Venus harbour the same precautions must be observed as in entering ; and when the tide serves in the morning, it will be generally found the most advantageous time for sailing ; as the land wind in fine weather, mostly blows with sufficient force to give a vessel good steerage way during that part of the day.

Water.—In the vicinity of Venus harbour there are fine pastoral districts, and water can be procured at a place named Cheriroo.

TIDES.—It is high water in Venus harbour, full and change, at 2h. 15m. ; rise 6 feet.

CAPE FINNIS.—From the south-west point of the peninsula on the eastern side of the opening leading into Venus harbour, the eastern shore of Anxious bay trends S.S.E. $\frac{3}{4}$ E. 12 miles, from whence it curves round southward and south-westward to a point, at $3\frac{1}{2}$ miles to the southward of which is cape Finnis, with a shoal rocky bight between them. The coast is generally of moderate elevation and sandy, with apparently a lagoon extending about 7 miles close along behind the shore, midway between the peninsula and Waldgrave isles.

ASPECT.—From the south-east shore of Streaky bay a range of hills takes a S.S.W. $\frac{1}{2}$ W. direction to about 6 miles eastward of Westall point ; from thence it nearly follows the trend of the coast to about 5 miles north-eastward of cape Blanche, and then sweeps round eastward to mounts Hall and Cooper, the former bearing N.E. $\frac{3}{4}$ N., distant 13 miles, and the latter N.E. by E. 22 miles from cape Radstock. From mount Cooper the range takes an East and S.E. direction to mount Southam, and from thence about S. by W. $\frac{1}{2}$ W. to mount Wedge, which bear respectively E. $\frac{3}{4}$ N., distant 20 miles, and S.E. by E. $\frac{3}{4}$ E. 19 miles from Weyland point ; the range then trends southward and terminates at about 10 miles eastward of Waldgrave isles.

INVESTIGATOR GROUP, of which the eastern and larger Waldgrave isle forms the easternmost, consists of several islands and rocks extending about W.S.W. 28 miles from the rocky bight North of cape Finnis.

WALDGRAVE ISLES.—The larger isle, which is 2 miles long, East and West, is connected with the rocky bight North of cape Finnis, and also with the smaller isle, 1 mile to the westward, by reefs, which for a vessel anchored in the south-east bight of Anxious bay would admit of no escape southward between these isles and the main-land, should the wind veer round and blow from the northward.

TWO DETACHED BREAKERS lie in line with Waldgrave isles, between about 1 and 4 miles westward of the smaller island; there are 27 fathoms at 2 miles from these breakers in all directions except to the eastward; and a clear channel $5\frac{1}{2}$ miles wide, with 25 to 28 fathoms, between these breakers and Flinders and Top-gallant islands to the south-westward.

FLINDERS ISLAND, the largest and most central of the Investigator group, is 6 miles long N.E. and S.W. and 3 miles broad at the centre; it forms nearly a square, with the south-western angle projecting farthest from the main body of the island. Rocks project from the points of the island, the intermediate sides being slightly embayed; but the eastern side alone offers good anchorage, although Capt. Flinders in 1802 anchored the *Investigator* on the north side of the island.

The **ANCHORAGE** on the east side of Flinders island may be approached with safety, taking care, however, to avoid a reef of rocks—on which the sea generally breaks—lying about 2 cables' lengths from the beach near the east point of the island, from which the reef is separated by a passage, having 3 and 4 fathoms in it.

DIRECTIONS.—The reef just described, may be easily avoided by approaching the anchorage from the north-eastward, and standing along the beach until a berth is picked up inside the reef, in 3 or 4 fathoms. This anchorage, though available for small craft in gales from N.W. round by West to S.W., should not be resorted to in an easterly gale, as a vessel would be very close in before she could be fairly got under way, with the beach as a lee shore.

No large vessel should at any time attempt to anchor within the reef, but rather seek shelter farther to the northward, so as to have a clear course before her, in the event of bad weather coming on from north or north-eastward.

The **LANDING-PLACE** on the beach under the reef, although sheltered to a certain extent, is sometimes difficult and unsafe, as the surf occasionally rolls in with considerable force.

The north-western side of Flinders island to the distance of 4 miles, is studded with reefs of a most dangerous nature and should be most care-

fully avoided. The western side of the island is quite open to the ocean swell, whilst the south-east side offers no anchorage, the coast being rocky and the water generally too deep close in shore to offer any inducement to seek shelter in that locality.

Supplies. — There is very good pasturage on Flinders island, and within the last few years a sheep station has been established. Vessels frequenting the island, will be able to procure mutton from the shepherd, who will also point out the position of the wells, which are near the anchorage.

TOP-GALLANT ISLES lie E. by N. 3 miles from the east point of Flinders island, and consist of one small, but high island, with three rocks, resembling ships under sail, off its east side; the whole being of small extent, and connected by a reef, with 25 to 30 fathoms all round them, at the distance of 5 or 6 miles.

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There is a passage between Flinders and Ward isles, with soundings in 35 fathoms at 2 miles eastward of the latter isles; but this passage can only be recommended during daylight.

PEARSON ISLES, the south-westernmost of the Investigator group, form a chain extending 11 to 17 miles southward from the western Ward isle. The northernmost of the Pearson isles is about 2 miles long, North and South, and rises to two remarkable peaks, one of which is 665 feet high, and visible at the distance of 30 miles. There is a small indentation on the east side of the island; but from the great depth of water, no anchorage could be obtained at a reasonable distance from the shore.

The other five isles of this chain are, like the northernmost isle, of abrupt formation, with steep rocky shores and no outlying dangers. Soundings in 48 fathoms were obtained at two miles to the eastward of the southernmost of these isles.

The southern portion of Pearson isles has not been surveyed; and the French chart places an islet S. by E. $\frac{1}{4}$ E. 7 or 8 miles from the south-west point of Flinders island; and another with a reef of dry rocks, at about 15 to 18 miles to the westward of Pearson isles. But as they were not seen by Flinders, and their positions were not professedly accurate, they do not appear on the Admiralty chart.

THE COAST from cape Finnis trends eastward 3 or 4 miles to where the chart shows two rocks near the shore, and from thence it takes a S.E. $\frac{1}{4}$ S direction 30 miles to the northern point of a bay, 9 miles wide, North and South, and 4 miles deep, of which Drummond point forms the south horn. This coast which is of moderate elevation, is rocky and barren forming alternate bights and small cliffy heads.

ROCKY ISLE.—At 4 miles off one of these heads lies a small rocky island, bearing N.W. by N., distant 14 miles from Drummond point; the sea breaks at a little distance off its south side; but towards the main-land captain Flinders thought the passage was clear. There are 35 fathoms at 5 miles to the southward and south-westward of the islet, and 40 fathoms midway between it and Pearson isles.

DRUMMOND POINT, S.E. $\frac{1}{2}$ S. 42 miles from the eastern Waldgrave isle, is a prominent cliffy head projecting 4 or 5 miles from the line of coast, and has a small dry rock and some breakers close to its extremity, with 25 to 35 fathoms on a sandy bottom, at 5 miles off it.

From Drummond point the coast trends about 4 miles to the eastward, and from thence nearly S. $\frac{1}{2}$ E. 10 miles to the foot of mount Greenly, at the north-east extreme of Coffin bay. This coast is sandy and rises gradually to some woody ranges at about 3 miles from the shore, and which terminate abruptly at about 2 miles to the southward of mount Greenly.

A ROCKY ISLET lies S. by E. $\frac{1}{4}$ E. 4 miles from Drummond point, and about the same distance from the main-land to the eastward.

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SIR ISAAC POINT, the south-western horn of Coffin bay, is the north extreme of a peninsula projecting 13 miles north-westward from the main-land; close to the point there are two small dry rocks, at half a mile from which there are 10 and 13 fathoms, on a loose bottom of broken shells, from whence the water deepens to 20 fathoms on either side, and to 22 fathoms within 3 miles of mount Greenly.

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MOUNT GREENLY, S.E. $\frac{1}{2}$ S. 11 $\frac{1}{2}$ miles from Drummond point, is 1100 high and well covered with wood; it is situated within 2 miles of the sandy east shore of Coffin bay upon a range of well wooded hills rising quickly from the beach.

SIR ISAAC POINT, the south-western horn of Coffin bay, is the north extreme of a peninsula projecting 13 miles north-westward from the main-land; close to the point there are two small dry rocks, at half a mile from which there are 10 and 13 fathoms, on a loose bottom of broken shells, from whence the water deepens to 20 fathoms on either side, and to 22 fathoms within 3 miles of mount Greenly.

COFFIN BAY, on the east side of Sir Isaac point, is 9 miles across N.E. $\frac{1}{2}$ E. from the point to the foot of mount Greenly. It runs in from the entrance at least 13 or 14 miles in a S.E. by S. direction, and towards some sandy cliffs and hills. From 20 fathoms in the entrance the depth gradually decreases to 5 and 4 fathoms near the centre of the bay. On the south-eastern shore the bay narrows and

fully avoided. The western side of the island is quite open to the ocean swell, whilst the south-east side offers no anchorage, the coast being rocky and the water generally too deep close in shore to offer any inducement to seek shelter in that locality.

Supplies. — There is very good pasturage on Flinders island, and within the last few years a sheep station has been established. Vessels frequenting the island, will be able to procure mutton from the shepherd, who will also point out the position of the wells, which are near the anchorage.

TOP-GALLANT ISLES lie E. by N. 3 miles from the east point of Flinders island, and consist of one small, but high island, with three rocks, resembling ships under sail, off its east side; the whole being of small extent, and connected by a reef, with 25 to 30 fathoms all round them, at the distance of 5 or 6 miles.

WARD ISLES.—The north-westernmost of the Investigator group, are two in number, the western and larger isle, in lat. $33^{\circ} 45'$ S., long. $134^{\circ} 15'$ E., and W. $\frac{1}{2}$ N. 8 miles from the south-west point of Flinders island, is half a mile long, N.W. and S.E., and 162 feet high. The smaller isle lies $1\frac{1}{2}$ miles to the south-eastward of the former, and both have reefs extending 1 and 2 miles westward from them, which should be carefully avoided by passing vessels.

There is a passage between Flinders and Ward isles, with soundings in 35 fathoms at 2 miles eastward of the latter isles; but this passage can only be recommended during daylight.

PEARSON ISLES, the south-westernmost of the Investigator group, form a chain extending 11 to 17 miles southward from the western Ward isle. The northernmost of the Pearson isles is about 2 miles long, North and South, and rises to two remarkable peaks, one of which is 665 feet high, and visible at the distance of 30 miles. There is a small indentation on the east side of the island; but from the great depth of water, no anchorage could be obtained at a reasonable distance from the shore.

The other five isles of this chain are, like the northernmost isle, of abrupt formation, with steep rocky shores and no outlying dangers. Soundings in 48 fathoms were obtained at two miles to the eastward of the southernmost of these isles.

The southern portion of Pearson isles has not been surveyed; and the French chart places an islet S. by E. $\frac{1}{4}$ E. 7 or 8 miles from the south-west point of Flinders island; and another with a reef of dry rocks, at about 15 to 18 miles to the westward of Pearson isles. But as they were not seen by Flinders, and their positions were not professedly accurate, they do not appear on the Admiralty chart.

THE COAST from cape Flinnis trends eastward 3 or 4 miles to where the chart shows two rocks near the shore, and from thence it takes a S.E. $\frac{1}{4}$ S direction 30 miles to the northern point of a bay, 9 miles wide, North and South, and 4 miles deep, of which Drummond point forms the south horn. This coast which is of moderate elevation, is rocky and barren forming alternate bights and small cliffy heads.

ROCKY ISLE.—At 4 miles off one of these heads lies a small rocky island, bearing N.W. by N., distant 14 miles from Drummond point; the sea breaks at a little distance off its south side; but towards the main-land captain Flinders thought the passage was clear. There are 35 fathoms at 5 miles to the southward and south-westward of the islet, and 40 fathoms midway between it and Pearson isles.

DRUMMOND POINT, S.E. $\frac{1}{4}$ S. 42 miles from the eastern Waldgrave isle, is a prominent cliffy head projecting 4 or 5 miles from the line of coast, and has a small dry rock and some breakers close to its extremity, with 25 to 35 fathoms on a sandy bottom, at 5 miles off it.

From Drummond point the coast trends about 4 miles to the eastward, and from thence nearly S. $\frac{1}{4}$ E. 10 miles to the foot of mount Greenly, at the north-east extreme of Coffin bay. This coast is sandy and rises gradually to some woody ranges at about 3 miles from the shore, and which terminate abruptly at about 2 miles to the southward of mount Greenly.

A ROCKY ISLET lies S. by E. $\frac{1}{4}$ E. 4 miles from Drummond point, and about the same distance from the main-land to the eastward.

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COFFIN BAY, on the east side of Sir Isaac point, is 9 miles across N.E. $\frac{1}{4}$ E. from the point to the foot of mount Greenly and runs in from the entrance at least 13 or 14 miles in a S.E. by S. direction towards some sandy cliffs and hills. From 20 fathoms in the entrance the depth decreases to 5 and 4 fathoms near the centre of the bay. The south-eastern shore the bay extends to the foot of mount Greenly.

fully avoided. The western side of the island is quite open to the ocean swell, whilst the south-east side offers no anchorage, the coast being rocky and the water generally too deep close in shore to offer any inducement to seek shelter in that locality.

Supplies. — There is very good pasturage on Flinders island, and within the last few years a sheep station has been established. Vessels frequenting the island, will be able to procure mutton from the shepherd, who will also point out the position of the wells, which are near the anchorage.

TOP-GALLANT ISLES lie E. by N. 3 miles from the east point of Flinders island, and consist of one small, but high island, with three rocks, resembling ships under sail, off its east side; the whole being of small extent, and connected by a reef, with 25 to 30 fathoms all round them, at the distance of 5 or 6 miles.

WARD ISLES.—The north-westernmost of the Investigator group, are two in number, the western and larger isle, in lat. $33^{\circ} 45'$ S., long. $134^{\circ} 15'$ E., and W. $\frac{1}{2}$ N. 8 miles from the south-west point of Flinders island, is half a mile long, N.W. and S.E., and 162 feet high. The smaller isle lies $1\frac{1}{2}$ miles to the south-eastward of the former, and both have reefs extending 1 and 2 miles westward from them, which should be carefully avoided by passing vessels.

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The other five isles of this chain are, like the northernmost isle, of abrupt formation, with steep rocky shores and no outlying dangers. Soundings in 48 fathoms were obtained at two miles to the eastward of the southernmost of these isles.

The southern portion of Pearson isles has not been surveyed; and the French chart places an islet S. by E. $\frac{1}{4}$ E. 7 or 8 miles from the south-west point of Flinders island; and another with a reef of dry rocks, at about 15 to 18 miles to the westward of Pearson isles. But as they were not seen by Flinders, and their positions were not professedly accurate, they do not appear on the Admiralty chart.

THE COAST from cape Finnis trends eastward 8 or 4 miles to where the chart shows two rocks near the shore, and from thence it takes a S.E. $\frac{1}{2}$ S direction 30 miles to the northern point of a bay, 9 miles wide, North and South, and 4 miles deep, of which Drummond point forms the south horn. This coast which is of moderate elevation, is rocky and barren forming alternate bights and small clifty heads.

ROCKY ISLE.—At 4 miles off one of these heads lies a small rocky island, bearing N.W. by N., distant 14 miles from Drummond point; the sea breaks at a little distance off its south side; but towards the main-land captain Flinders thought the passage was clear. There are 35 fathoms at 5 miles to the southward and south-westward of the islet, and 40 fathoms midway between it and Pearson isles.

DRUMMOND POINT, S.E. $\frac{1}{2}$ S. 42 miles from the eastern Waldgrave isle, is a prominent clifty head projecting 4 or 5 miles from the line of coast, and has a small dry rock and some breakers close to its extremity, with 25 to 35 fathoms on a sandy bottom, at 5 miles off it.

From Drummond point the coast trends about 4 miles to the eastward, and from thence nearly S. $\frac{1}{2}$ E. 10 miles to the foot of mount Greenly, at the north-east extreme of Coffin bay. This coast is sandy and rises gradually to some woody ranges at about 3 miles from the shore, and which terminate abruptly at about 2 miles to the southward of mount Greenly.

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From Drummond point the coast trends about 4 miles to the eastward, and from thence nearly S. $\frac{1}{2}$ E. 10 miles to the foot of mount Greenly, at the north-east extreme of Coffin bay. This coast is sandy and rises gradually to some woody ranges at about 3 miles from the shore, and which terminate abruptly at about 2 miles to the southward of mount Greenly.

A ROCKY ISLET lies S. by E. $\frac{1}{4}$ E. 4 miles from Drummond point, and about the same distance from the main-land to the eastward.

MOUNT GREENLY, S.E. $\frac{1}{2}$ S. $11\frac{1}{2}$ miles from Drummond point, is 1100 high and well covered with wood; it is situated within 2 miles of the sandy east shore of Coffin bay upon a range of well wooded hills rising quickly from the beach.

SIR ISAAC POINT, the south-western horn of Coffin bay, is the north extreme of a peninsula projecting 13 miles north-westward from the main-land; close to the point there are two small dry rocks, at half a mile from which there are 10 and 13 fathoms, on a loose bottom of broken shells, from whence the water deepens to 20 fathoms on either side, and to 22 fathoms within 3 miles of mount Greenly.

COFFIN BAY, on the east side of Sir Isaac point, is 9 miles across N.E. $\frac{1}{2}$ E. from the point to the foot of mount Greenly, and runs in from the entrance at least 13 or 14 miles in a S.E. by S. direction towards some sandy cliffs and hills. From 20 fathoms in the entrance the soundings gradually decrease to 5 and 4 fathoms near the centre of the bay. From thence to the south-eastern shore the bay appears to be mostly occupied by shoals

within which however, there was discovered in 1858, a fine sheet of water, named Port Douglas ; it was not then surveyed, but if, on subsequent examination, an entrance into it has been found deep enough for vessels of ordinary draught, this port must be a valuable place for shipping the produce of the fine runs in the vicinity.

ANCHORAGE.—The best anchorage in Coffin bay is in 3 to 4 fathoms, at about S.S.E. 3 miles from Sir Isaac point, with the inner point to the southward of Sir Isaac point bearing from N.N.W. to N. $\frac{1}{2}$ W. ; as the southern part of the bay is approached towards some high white sand-hills on the west shore, the water gradually shoals.

A stranger not driven into Coffin bay by stress of weather, should prefer Port Lincoln, in Spencer gulf, about 40 miles to the south-eastward of Sir Isaac point, for procuring any of the supplies this part of the coast affords; as it is in every respect a more desirable anchorage, and affords perfect shelter from all winds.

REEF POINT, S.W. by S. $5\frac{1}{2}$ miles from Sir Isaac point, has two dry rocks close off it, from which a reef of sunken rocks stretches out 2 miles to the westward ; as the sea rolls in with great violence upon this danger it should be carefully avoided.

Between Reef point and Whidbey point, S. by W. $\frac{1}{2}$ W. 6 miles from it, the coast forms an exposed bay, with breakers near the shore.

WHIDBEY and AVOID POINTS.—The former is the rocky south-west extremity of the peninsula, of which Sir Isaac point forms the north projection ; from the west extreme of Whidbey point its south side, which is fronted by breakers, trends East $2\frac{1}{2}$ miles to the north-west point of Avoid bay, which extends from thence S.E. by E. $\frac{3}{4}$ E. 9 miles to Avoid point, a low projection with two small rocky isles off it.

GREENLY ISLES, which are two in number, are peaked, and of abrupt granite formation ; the south-eastern and larger isle, which bears W. by S. $\frac{1}{2}$ S., distant 14 miles from Whidbey point, is 636 feet high, and visible in clear weather, at the distance of 30 miles. The soundings in the vicinity of these isles are 50 fathoms at a short distance to the northward, and 60 fathoms at 24 miles to the westward of them.

ROCKY ISLE, S. by W. $\frac{1}{2}$ W. 11 miles from the peak of the south-eastern Whidbey isle, is a precipitous granite rock 170 feet high, and has a reef of rocks running out from it about half a mile in a north-westerly direction.

EAGLE ISLET.—Captain Stokes in 1840, discovered a small high rocky islet in lat. $34^{\circ} 49'$ S., long. $134^{\circ} 49' 30''$ E., and bearing nearly S. $\frac{3}{4}$ E., distant 9 miles from the high peak on Greenly isle. As Mr. Douglas does not notice this islet in his sailing directions, it is probably no other than the

Rocky islet just described ; for they only differ $1\frac{1}{2}$ miles in latitude, although Captain Stokes places Beagle islet 7' of longitude East of Rocky islet, very nearly agreeing with his bearing and distance of Greenly Isle peak, whilst Mr. Douglas only gives the latitude and longitude of Rocky islet, independently of the peak.

WHIDBEY ISLES, which are seven in number, are small but considerably elevated, and form a chain nearly in line between Rocky isle and Avoid point. Four Hummocks, the westernmost of these isles, are four rocky lumps, with smaller rocks scattered amongst them, the central islet bearing E. by N. $\frac{1}{2}$ N., distant 15 miles from Rocky isle.

Perforated isle, the largest and most central of Whidbey isles, is 1 mile long, North and South, and is visible in a clear day, at the distance of 20 miles ; near its summit it has an aperture, through which the light is seen. On both sides of Perforated isle there are 19 fathoms at half a mile from its north point, and 19 to 23 fathoms in a channel 6 miles wide, between this isle and the two easternmost of Whidbey group, which lie close off Avoid point.

The two easternmost of Whidbey isles, which are small and rocky, lie between 1 and 3 miles to the south-westward of Avoid point, with which they are connected by a reef. There are 20 to 23 fathoms at about a mile from the outer islet, and 17 fathoms at $1\frac{1}{2}$ miles from the low sandy shore to the eastward of the point.

AVOID BAY, which nearly isolates Whidbey point to the westward, has a small smooth rocky islet lying about a mile from the beach in the north-west bight of the bay. There are some black rocks and shoal water near a projection of the shore, at nearly midway from Avoid point to the west extreme of the bay, with 21 fathoms at a little more than a mile from them ; but Avoid bay being much exposed to the southward and south-westward, it affords no available anchorage.

CAPE WILES.—The coast from Avoid point trends East $5\frac{1}{2}$ miles, and then S.E. $\frac{3}{4}$ S. 18 miles to a low sloping point, with breakers at a short distance off it, at East 3 miles, from which is cape Wiles, a steep cliffy head, with two high rocks and a lower one near it. The coast from Avoid point to within 4 miles of the low sloping point is composed of whitish cliffs, with lower land forming bights between them.*

REEFS.—A circular reef, not much below the surface of the water, lies $6\frac{1}{2}$ miles off the coast, in line with and nearly midway between Perforated isle and the low sloping point to the westward of cape Wiles, with the

* See Plan on Chart of Australia, South Coast, Sheet 3, No. 1061 ; scale, $m = 0.3$ of an inch.

former bearing N.W. by W. $\frac{3}{4}$ W., distant $12\frac{1}{2}$ miles, and Avoid point N. by W. $\frac{3}{4}$ W. 9 miles. This danger, on which the great south-east swell breaks heavily at times, has 25 fathoms at a little more than a mile to the westward of it, and 30 to 40 fathoms at 7 miles in the same direction.

Another circular reef, partly uncovered, lies W. by N. $\frac{3}{4}$ N., a little more than 3 miles from the low sloping point westward of cape Wiles, and about 2 miles from the shore. At 3 and nearly 15 miles to the westward of this danger there are soundings in 40 fathoms, with intermediate depths of 35 and 48 fathoms, by which it will be seen that the lead is no certain guide for approaching this part of the coast, and that it should be avoided at night, or in thick weather.

LIGUANEA ISLE, S. by W. 3 miles from the sloping point West of cape Wiles, is $1\frac{1}{2}$ miles long, with its summit towards the north-east end, from whence it slopes away to the S.W., and in that direction is bordered with many rocks and breakers. There are 40 fathoms at 3 and 4 miles to the southward and S.E. of this isle, and 60 fathoms, on a coral bottom, at 20 miles S.W. $\frac{1}{2}$ W. from it; but the soundings are irregular and apparently deep close to the shore.

SLEAFORD BAY extends from cape Wiles E. $\frac{3}{4}$ N. $7\frac{1}{2}$ miles to a point projecting from the land of cape Catastrophe, and is about $3\frac{1}{2}$ miles deep; but it is quite open to the southward and S.E., and has not been sounded.

There are 40 fathoms at 4 or 5 miles to the southward and S.E. of cape Wiles, and the same depth at that distance to the southward of the east point of the bay; at $1\frac{3}{4}$ miles to the south-eastward of which there is a small islet, fronted by breakers and a dry rock.

Should there be convenient anchoring depth in the north-west bight of Sleaford bay, which does not appear likely, the trending of the east side of cape Wiles, upwards of 3 miles to the N. by W. $\frac{1}{2}$ W., appears to hold out a prospect of affording shelter there from westerly winds; but there can be no shelter from the southerly swell that generally rolls in upon this part of the coast: therefore, in the absence of information, a vessel should give the preference to Memory cove, round the east side of cape Catastrophe, or to Port Lincoln, 15 miles farther up Spencer gulf.

SLEAFORD LAGOON is a sheet of brackish water on the main-land, nearly 4 miles long, North and South; and 1 mile to half a mile wide; it is divided near its centre into two branches, one trending southward and the other south-eastward, and both terminating within 100 yards of the head of Sleaford bay. The northern extreme of this lagoon extends to about 2 miles south-westward of some fresh-water pits, at the head of Port Lincoln, to the northward.

WEST POINT of CAPE CATASTROPHE.—From the projecting east point of Sleaford bay the coast takes a S.E. direction $6\frac{1}{2}$ miles to West point, the south-west extremity of cape Catastrophe, a clifly headland, in lat. $35^{\circ} 1' S.$, long. $135^{\circ} 54' E.$, rising to a smooth conical hill 460 feet high, and clothed with vegetation. The chart shows a dry rock close to the western side of this point.

ISLE WILLIAMS, the north-west extreme of which lies S.S.E. 1 mile from West point, is about 3 miles in circuit, its south side being very rugged, with long ledges of rock running out from the cliffs ; there is a bay on the north side with a small sandy beach at its head. The summit of the island, which is nearly flat, is covered with stunted bushes about 2 feet high, and is much burrowed by mutton-birds, and in the winter months is frequented by cape barren geese.

The passage between isle Williams and the main-land is quite clear, with 12 fathoms in mid-channel, and 18 to 30 fathoms on either side, on a bottom of fine sand ; but a heavy sea and race extend across the passage. At one-fifth of a mile from the west side of the island there are 20 fathoms, and 56 fathoms within $1\frac{1}{2}$ miles to the S.W. of it ; but on its parallel farther to the westward the depth is not so great, 40 fathoms, on a regular sandy bottom, being found at the distance of 5 to 20 miles in that direction.

CHAPTER II.

AUSTRALIA.—SOUTH COAST, SPENCER GULF.

VARIATION from 4° to $4^{\circ} 40'$ East in 1868.

SPENCER GULF, the greatest inlet on the south coast of Australia, is 47 miles across at the entrance from cape Catastrophe E. by S. $\frac{1}{4}$ S. to cape Spencer, and from the entrance extends in nearly a N.N.E. direction 180 miles to Port Augusta, at the head of the gulf, with navigable water for vessels of the greatest burden. Although the entrance is 47 miles wide, this space is partly occupied by Thistle island, near the western shore,* and the Gambier group, midway between that island and cape Spencer; besides these, there lie in the offing to the south-westward, the Low rocks and the straggling Neptune isles.*

NEPTUNE ISLES are three in number, with several rocks, above and under water, the south-easternmost isle being in lat. $35^{\circ} 22' 15''$ S., long. $136^{\circ} 7' 45''$ E. This isle, which is barely 2 miles in circumference, seems entirely composed of black-looking granite, above 100 feet high, with a little stunted vegetation. The sea breaks so heavily on the south sides of these islands, that from a distance of 2 or 3 miles the spray has been seen flying 40 or 50 feet over the top of the south-easternmost isle.

The next Neptune isle, which lies about N.N.W. 1 mile from that just described, is more than 2 miles in circuit, with its greatest extent North and South; and, like the other isles, this also appears to be composed of black-looking granite, 115 to 120 feet high. The passage between the two south-eastern of the Neptune isles is about one quarter of a mile wide, but it has two or three large rocks in it.

The North westernmost isle, the largest of the Neptune group, and which lies N.N.W. $\frac{1}{2}$ W. 6 miles from the south-easternmost isle, is 3 miles in circuit and 160 feet high. It is nearly flat-topped, its south and south-west sides forming granite cliffs, against which the sea rolls in very heavily. At a quarter of a mile eastward of the south point of the island is a rock

* See Chart of Australia, South Coast, Gulfs of St. Vincent and Spencer, No. 2389; scale, $m = 0.13$ of an inch; and Plan of Port Lincoln on Chart of Australia, South Coast, sheet 3; scale, $m = 0.3$ of an inch.

on which the sea only breaks at times, but then with great violence. There is a bay on the east side of the island with a small sandy beach, on which there was a heavy surf.

An islet lies about a quarter of a mile to the eastward of the north-east point of the north-westernmost Neptune isle, consisting of a mass of granite half a mile long, East and West, 1 cable broad, and 75 feet high. At half a mile off the east end of the islet there is a heavy breaker more than 1 cable's length across.

There are 40 to 50 fathoms between the south-eastern and north-westernmost Neptune isles, and 55 fathoms at 2 or 3 miles to the southward of them.

LOW ROCKS, nearly North $3\frac{1}{2}$ miles from the north-westernmost Neptune isle, are a straggling mass about 2 cables long, East and West, 50 yards broad and 30 feet high. At N.E. by N. 4 cables' lengths from them is a small rock a few feet above water, with a heavy break upon it. There are 42 fathoms between the north-westernmost isle and Low rocks, and 40 fathoms in the channel between Low rocks and Thistle island.

As Neptune isles are rocky and surrounded by breakers, and Low rocks have little elevation, they should be carefully avoided at night.

GAMBIER ISLES, N.E. by E. 21 miles from the south-easternmost Neptune isle, consist of Wedge isle and four small islets near it. Wedge isle is situated nearly midway between cape Spencer and Thistle island, its summit, in lat. $35^{\circ} 10' 41''$ S., long. $136^{\circ} 30'$ E., being visible at the distance of 30 miles, may be seen by nearly every vessel passing into or out of Spencer gulf. This island is 3 miles long, E.S.E. and W.N.W., with an average breadth of one mile; three of its sides consist of cliffs with a rock awash, on which the sea always breaks, at W. by S. $\frac{1}{2}$ S. 4 cables from the north-west point, and a reef and some sunken rocks, extending more than a quarter of a mile from a low projection of the island, at 1 mile to the south-eastward of the point. From the south-east extreme the island rises gradually to the height of 662 feet, forming nearly a perpendicular cliff to the southward, which gives the island a wedge-like appearance from a distance. There is a sandy beach on the north-eastern side of the island, off which there is good anchorage in 5 or 6 fathoms, sheltered from N.W. and round westward to S.E., at about a quarter of a mile from the shore, with the house or east corner of the field on the island bearing South, and the north-west point N.W.: landing on the beach is generally easy.

Wedge isle, which is principally formed of limestone, is mostly covered with low bushes and casuarina trees, with a little grass, and has for some years been used as a sheep run; but in May 1863 it was deserted. There was a good stone house, with the remains of a large garden and a field sown with barley, besides stock yards behind the beach, and there were

several wells of good water in the low land within the beach, to the south-eastward of the house, and another well by the sand-hills near the north-west point. One sheep and a few goats were seen on the cliffs.

PEAKED ROCKS are two conical islets, one S.W. half a mile and the other S.E. a quarter of a mile from the south-east point of Wedge isle. The outer rock is 212 feet, and the inner one 141 feet high, and both are much frequented by seals.

NORTH ISLET, the second in size of the Gambier group, lies $1\frac{1}{2}$ miles to the northward of Wedge isle, and is three-quarters of a mile long, East and West, half a mile broad, and 155 feet high. Landing is easy on its north-west side in fine weather. It has stunted vegetation and a few casuarina trees on it: the whole islet is much burrowed by mutton-birds, and there were 20 or 30 goats on it in April 1863.

There is a 9-fathoms channel between Wedge and North isles; but the two islets shown on the chart, one lying in this channel and the other midway between Wedge and Thistle islands, do not exist.

SOUTH-WEST ROCK, a mass of granite 70 feet high, bears W. $\frac{3}{4}$ S., distant nearly 4 miles from the south-east point, and $1\frac{1}{2}$ miles from the nearest part of Wedge isle, with the west and north-west points of the island and the west extreme of North islet in line. This rock, which is about 1 mile in circumference, is divided into two unequal parts by a cleft running N.N.E. and S.S.W. There is a clear channel, with 30 fathoms, between South-west rock and Wedge isle.

FOUL GROUND.—A rocky patch lies S.E. 4 miles from Wedge isle, with 28 to 32 fathoms all round it; it is nearly circular, and about a quarter of a mile in diameter, with occasionally heavy breakers upon it, during and after west and south-west gales.

DIRECTIONS.—When on the shoalest part of the Foul ground, the west extreme of North islet will be just touching Wedge isle, bearing N.W. by N., and the south side of the highest Peaked rock will be in line with the south-west point of the island, bearing N.W. by W. In order, therefore, to pass well to the northward of the Foul ground, keep the outer Peaked rock well open South of Wedge isle, or North islet well open North of the island; and to pass to the westward keep North islet entirely shut in.

WARD ROCK, which has 6 fathoms water over it, lies West three-quarters of a mile from North islet, and N. by W. $\frac{1}{4}$ W. 1 mile from the north-west point of Wedge isle. This rock is less than 1 cable in extent each way, and rises nearly abruptly from the depth of 20 fathoms. Ward rock is dangerous in a heavy swell, as it then breaks violently at times: in fine weather it does not show.

DIRECTIONS.—In proceeding between Ward rock and the rock awash

at W. by S. $\frac{1}{2}$ S. 4 cables' lengths from the north-west point of Wedge isle, both these rocks may be cleared by keeping the high cliff of the east point just open of the north-west point of the island, bearing S.E. by E.

The north-west point of Wedge isle may be rounded close to ; but after passing it a good berth should be given to the reef and sunken rocks extending from the low point 1 mile south-eastward of the north-west point, after having cleared which the vessel may come to in the anchorage off the sandy beach, as already directed.

MIDDLE and N.N.E. ROCKS, the only dangers of the Gambier group, to the northward of North islet, are both awash and lie respectively North 1 mile and N.N.E. 3 miles from the islet ; Middle rock being in line with the west extreme of North islet, the north-west and west points of Wedge isle and South-west rock. There are 18 fathoms between North islet and Middle rock, and 20 to 24 fathoms between the two rocks, which may be passed close to.

DIRECTIONS.—To clear Middle and N.N.E. rocks to the westward, keep South-west rock its own breadth open of the west point of Wedge isle bearing S.S.W. $\frac{1}{2}$ W. The eastern Peaked rock kept clear of Wedge isle bearing S. $\frac{1}{2}$ W. will clear Middle and N.N.E. rocks to the eastward.

TIDES.—It is high water at the Gambier isles, full and change, at 2h.; springs rise about 5 feet. The flood stream sets to the N.W., and the ebb to the S.E., from less than half a knot to three-quarters of a knot.

THISTLE ISLAND, which is the largest island in the entrance of Spencer gulf, lies near the western shore, and forms part of the eastern side of Thorny passage, the south-east extremity of the island bearing about E. by S., distant 14 miles from the West point of cape Catastrophe. Thistle island is 9 miles long, N.W. and S.E., and, although only three-quarters of a mile broad at the centre, it increases to 2 miles in breadth towards each end. The centre of the island rises to the height of 772 feet, and may be seen in clear weather, at the distance of 35 miles.*

WATERHOUSE POINT, the narrow south-east extreme of Thistle island, is a rugged clifty head 120 to 130 feet high, sloping gradually down to the northward on either side. An islet, lies W.S.W. three-quarters of a mile from the point, at a quarter of a mile from the shore, with 6 fathoms between it and the point ; but in a gale the water breaks right across. Waterhouse point is fronted with high black rocks and very deep water, and as the tide streams sweep round the point at the rate of 2 knots, the flood to the northward and the ebb to the southward, the latter meet

* Latitude and description by Commander Hutchison, but his longitude of the island, 3' 50" East of that on the chart, cannot be adopted till there be a reconstruction of this part of the chart.

ing the south-westerly swell, causes, with southerly winds, a dangerous race, which is felt as far as 2 miles off the point.

SOUTH ROCK, which lies S.W. $1\frac{1}{2}$ miles from Waterhouse point, is about 100 yards in extent ; it is just awash and has always heavy breakers on it. There is deep water all round this rock, and there are 30 fathoms between it and the islet.

DIRECTIONS.—Vessels rounding the south-east end of Thistle island should give it a berth of more than 2 miles, to avoid South rock and the race off Waterhouse point.

WATERHOUSE BAY, on the eastern side of Thistle island, at about 1 mile northward of Waterhouse point, affords shelter for coasters in 3 fathoms, sand, at a cable's length from the beach, with the southern point of the bay bearing E.S.E. Care must be taken, when going in or out, to avoid a rocky patch extending a cable's length, East and West, which lies from the point N.W. nearly one-third of a mile, with its inner end at 1 cable's length from the beach. This patch only breaks at times, though part of it is nearly awash at low water.

From Waterhouse bay to the south-eastern point of Whaler bay, about N.W. by N. $3\frac{1}{2}$ miles from Waterhouse point, the eastern coast of Thistle island consists of sandy beaches and rocky points with ledges running out, but with no dangers beyond 2 cables' lengths from the shore. The soundings deepen rapidly to more than 20 fathoms at $1\frac{1}{2}$ miles from this part of the coast.

WHALER BAY.—The south-eastern point of Whaler bay is rocky, with a limestone cliff, and points to the northward ; on its western side the land recedes, and a fine sandy beach forms Whaler bay, which affords good anchorage, for coasters, in 4 fathoms, sand, sheltered from West round southward to East, with the south-eastern point bearing E.N.E., distant a quarter of a mile. There is good schnapper fishing within the south-eastern point of Whaler bay, and firewood may be cut in abundance.

At W. by N. about 1 mile from the south-east point of Whaler bay the high cliffs at the centre of Thistle island commence and continue 2 miles in a N.W. direction, after which alternate beaches and points extend to Observatory point, the north extremity of Thistle island, bearing N.W., distant 6 miles from the south-eastern point of Whaler bay.

OBSERVATORY POINT is a low projection of a long sandy beach, extending on one side S.E. 1 mile, and on the other, S.W. an equal distance. From the north-west side of Observatory point a sand-flat extends three-quarters of a mile, studded with rocky patches, some not having more than 5 feet over them at low water. There are occasionally breakers on this flat with strong south or south-west winds.

ANCHORAGE.—On the north-eastern side of Thistle island the soundings gradually shoal to the north-westward, and a vessel can get good anchorage in 7 fathoms on a sandy bottom, with Observatory point bearing W.N.W., distant three-quarters of a mile, and the south-east end of the beach S. by W. or South. Here the tide streams never set more than half a knot, the flood sometimes to the S.E. and the ebb to the N.W.

SOUTH-WESTERN COAST of THISTLE ISLAND.—Between Waterhouse point and another point to the westward, abreast of the islet before noticed, the coast forms a deep bay, with two small sandy beaches at its head; the water shoals gradually as they are approached; but the bay does not afford good anchorage, as the south-westerly swell sets into it.

FOSSIL POINT.—From the western point of the bay just described, the south-western coast of Thistle island takes a N.W. direction $2\frac{3}{4}$ miles to Fossil point, at a quarter of a mile to the south-eastward of which is a gully containing fossil trees of various sizes.

From Fossil point the coast trends North $1\frac{1}{4}$ miles, and then extends north-westward 3 miles, in nearly a direct line, to a sandy beach, and is formed of reddish limestone cliffs, 600 to 400 feet high. The cliffs which are highest in the bight, fall gradually and assume a white appearance, being formed of white limestone nodules and sand on a granite base. Rocks, on which the sea occasionally breaks, extend half a mile southward from the beach.

The prevailing south-west winds have blown the sand from the beach nearly across the island to the north-eastward, forming a causeway of white sand, which, at the distance of three-quarters of a mile from the beach, has formed a sand-hill 268 feet high, over which the sand is driven, giving it a very remarkable appearance.

The coast from the sandy beach trends W.S.W. 1 mile to a high white cliff, with a ledge of rocks, on which the sea breaks, extending 2 cables' lengths to the southward. Between this cliffy projection and a point lying N.N.W. 1 mile from it, the coast forms a bay, and from thence becomes rocky, with whitish limestone cliffs, gradually falling to the northward, and takes a N.E. direction for about a mile to the south-west point of Snug cove, a boat harbour between this point and the south-west extreme of the beach extending from Observatory point.

Thistle island has from time to time, been used as a sheep and cattle run, but has not been found hitherto to answer; owing, it is stated, to the cattle and sheep eating some poisonous grass or herb which grows on the island: otherwise it appears very fit for grazing purposes. In 1863 the island was deserted; but there was a good weather-board house, with garden and out-buildings, just within the beach North of Snug cove; in

The ground was wet in some parts of slightly brackish water. There were four heads of cattle and several goats, and numerous turkeys were seen in the island.

TIDES.—It is high water in Suez cove, full and change, at 2h. 12m.; the highest tide at springs being 5 feet: but the rise and time of high water seem to be influenced a great deal by the wind; strong westerly winds producing, apparently, the highest tides. The times of high and low water seem to be regular for the first week after full and change; after which there is only one tide in 24 hours for five or six days, with high water from 5h. 30m. to midnight; after which the tides again become regular.

HOPKINS ISLE.—This is also as Snake isle, lies about three-quarters of a mile off the white cliffs of the north-west extreme of Thistle island, to which its rocky shore bears a great resemblance. Hopkins isle is 1 mile long, N.E. and S.W., half a mile broad, and rather flat-topped, with perpendicular cliffs: it is about 200 feet high, its sandy surface being frequented all over by marine birds.

The passage between Thistle and Hopkins islands is about half a mile wide, but it is blocked up with rocks and breakers, the rollers on the ebb frequently breaking right across. A few detached rocks lie nearly 1 mile northward of the island, and abreast of the landing place, which is on a small point of sand.

This island is dangerous to approach from the southward, as the rocky shore, extending to what Thistle island appears to extend nearly three-quarters of a mile northward towards Smith isle. There is a sunken rock on this shore at N. by W. 4 cables' lengths from Hopkins isle, upon which the sea breaks heavily, except in fine weather, when it does not break at all on the rock.

BLACK ROCK. N. $\frac{1}{2}$ W. nearly $1\frac{1}{2}$ miles from Observatory point, the north extreme of Thistle island is nearly awash at high water, but at low water appears as a mass of black granite 6 feet above water, and 50 yards in circumference: but rocks under water extend from it half a cable's length all round, and a ledge projects 2 cables' lengths to the northward. There are only 3 fathoms between Hopkins isle and Black rock, and 4 fathoms between the rock and Observatory point.

There is seldom much broken water on Black rock, and when coming from the northward late in the afternoon, it is not easily distinguished until within half a mile of it. From Black rock the cliffy extremes of Hopkins and Thistle islands appear a little open, bearing S.S.W., and the rocky projection S.E. of Observatory point is in line with the highest part of Thistle island bearing S. by E. $\frac{1}{2}$ E.

CLEARING MARKS.—Hopkins isle kept well open of Thistle isle clears Black rock to the westward, and the projection to the S.E. of Observatory point kept between the high cliffs and the south-east point of Whaler bay, leads between Black rock and the flat north-westward of Observatory point.

PORTER ROCK, N.N.E. $\frac{1}{4}$ E. $1\frac{3}{4}$ miles from Black rock, with the cliffs of Thistle and Hopkins islands just opening to the S.S.W., is a covered patch 2 cables long and 150 yards across, the least water on it being towards its northern end, where there are several knobs with only 3 feet on them at low water; towards the southern extreme there are 2 fathoms. This rock is very dangerous, as it lies in the direct track of vessels from the south-eastward proceeding to Port Lincoln, with seldom sufficient breakers upon it to attract attention, and frequently there is no broken water upon it for some days.

CLEARING MARKS.—Porter rock is cleared to the eastward by keeping Hopkins isle closed in by Thistle island; and to the westward, by the same islands being kept well open of each other; the northernmost of the high-wooded conical hills North of Memory cove open to the northward of Taylor isle, bearing West, leads three-quarters of a mile northward of this rock.

From Black rock to Porter rock there are 6 fathoms, on a rocky bottom, and soundings in 7 fathoms extend N.W. 1 mile from Porter rock; with these exceptions there are 10 and 11 fathoms about it.

CAPE CATASTROPHE.—The general aspect of the coast about this cape is high and rocky, with cliffs of reddish and white limestone 50 to 100 feet high, behind which the land rises to conical hills densely wooded with gum scrub to their summits. From West point, the southern extremity of cape Catastrophe, the coast trends N.E. by E. $\frac{3}{4}$ E. 3 miles to the south-east point of the cape, and forms two small exposed sandy bays, separated by some projecting cliffs of whitish and level aspect. Behind the shore the land rises to a rocky range of considerable elevation, upon which there are a few trees. The south-east extreme of cape Catastrophe is high and rocky, with a ledge of black rocks, on which the sea breaks heavily, extending half a cable's length from it.

SUNKEN ROCK.—The chart shows a small sunken rock, on which the sea breaks only at times, bearing E.N.E., distant $2\frac{1}{2}$ miles from the north-east extremity of isle Williams, and S.E. $\frac{3}{4}$ S. nearly 2 miles from the south-east extremity of cape Catastrophe. A bank of 12 fathoms, on which the water is much agitated, extends from the cape towards the rock, which has 22 fathoms close to its verge on each side.

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The passage between Thistle and Hopkins islands is about half a mile wide, but it is blocked up with rocks and breakers, the rollers on the ebb frequently breaking right across. A few detached rocks lie nearly 1 mile northward of the island, and abreast of the landing place, which is on a small patch of sand.

This island is dangerous to approach from the southward, as the rocky shoal connecting it with Thistle island appears to extend nearly three-quarters of a mile south-westward towards Smith isle. There is a sunken rock on this shoal at S. by W. 4 cables' lengths from Hopkins isle, upon which the sea breaks heavily, except in fine weather, when it does not break at all on the rock.

BLACK ROCK, N. $\frac{3}{4}$ W., nearly $1\frac{1}{2}$ miles from Observatory point, the north extreme of Thistle island, is nearly awash at high water, but at low water appears as a mass of black granite, 6 feet above water, and 50 yards in circumference; but rocks under water extend from it half a cable's length all round, and a ledge projects 2 cables' lengths to the northward. There are only 3 fathoms between Hopkins isle and Black rock, and 4 fathoms between the rock and Observatory point.

There is seldom much broken water on Black rock, and when coming from the southward late in the afternoon, it is not easily distinguished until within half a mile of it. From Black rock the cliffy extremes of Hopkins and Thistle islands appear a little open, bearing S.S.W., and the rocky projection S.E. of Observatory point is in line with the highest part of Thistle island, bearing S. by E. $\frac{3}{4}$ E.

CLEARING MARKS.—Hopkins isle kept well open of Thistle isle clears Black rock to the westward, and the projection to the S.E. of Observatory point kept between the high cliffs and the south-east point of Whaler bay, leads between Black rock and the flat north-westward of Observatory point.

PORTER ROCK, N.N.E. $\frac{1}{4}$ E. $1\frac{3}{4}$ miles from Black rock, with the cliffs of Thistle and Hopkins islands just opening to the S.S.W., is a covered patch 2 cables long and 150 yards across, the least water on it being towards its northern end, where there are several knobs with only 3 feet on them at low water; towards the southern extreme there are 2 fathoms. This rock is very dangerous, as it lies in the direct track of vessels from the south-eastward proceeding to Port Lincoln, with seldom sufficient breakers upon it to attract attention, and frequently there is no broken water upon it for some days.

CLEARING MARKS.—Porter rock is cleared to the eastward by keeping Hopkins isle closed in by Thistle island; and to the westward, by the same islands being kept well open of each other; the northernmost of the high-wooded conical hills North of Memory cove open to the northward of Taylor isle, bearing West, leads three-quarters of a mile northward of this rock.

From Black rock to Porter rock there are 6 fathoms, on a rocky bottom, and soundings in 7 fathoms extend N.W. 1 mile from Porter rock; with these exceptions there are 10 and 11 fathoms about it.

CAPE CATASTROPHE.—The general aspect of the coast about this cape is high and rocky, with cliffs of reddish and white limestone 50 to 100 feet high, behind which the land rises to conical hills densely wooded with gum scrub to their summits. From West point, the southern extremity of cape Catastrophe, the coast trends N.E. by E. $\frac{3}{4}$ E. 3 miles to the south-east point of the cape, and forms two small exposed sandy bays, separated by some projecting cliffs of whitish and level aspect. Behind the shore the land rises to a rocky range of considerable elevation, upon which there are a few trees. The south-east extreme of cape Catastrophe is high and rocky, with a ledge of black rocks, on which the sea breaks heavily, extending half a cable's length from it.

SUNKEN ROCK.—The chart shows a small sunken rock, on which the sea breaks only at times, bearing E.N.E., distant $2\frac{1}{2}$ miles from the north-east extremity of isle Williams, and S.E. $\frac{2}{3}$ S. nearly 2 miles from the south-east extremity of cape Catastrophe. A bank of 12 fathoms, on which the water is much agitated, extends from the cape towards the rock, which has 22 fathoms close to its verge on each side.

A good look-out was kept for this rock by Commander Hutchison on several occasions, when there was a heavy swell running, but nothing like a break was seen, except the tail of the race off cape Catastrophe; nor were any signs of shoal water seen from the Colonial surveying vessel, *Beatrice*, when sailing in the vicinity, with a light wind and very heavy swell.

TIDES.—Strong tide-streams run close round cape Catastrophe, the ebb setting S.W. and the flood N.E. between it and isle Williams, causing with the wind on shore, a race which would be dangerous to a small vessel.

From the south-east point of cape Catastrophe the coast, consisting of high cliffs, mostly of granite formation, trends N. by W. $\frac{1}{2}$ W. $1\frac{1}{2}$ miles to the east point of Memory cove; this point, which is very low, may be rounded in 8 fathoms at the distance of 20 yards.

MEMORY COVE is about half a mile across, East and West, and one-third of a mile deep, with a narrow sandy beach, 1 cable long in the bight. It is well sheltered from all winds from N.N.W. round by West to S.E.; but with north-east or north winds a short sea gets up, which washes the sand off the beach, leaving the rocks underneath exposed.

The *Beatrice* used to anchor in 5 fathoms, sand, with the east point of the cove in line with the north cliff of Hopkins isle bearing E. $\frac{1}{2}$ N., and the east corner of the beach South; but a larger vessel might anchor farther out in 8 or 9 fathoms, with the point touching the north extreme of Smith isle bearing S.E. by E., and the east extreme of the beach S. by W.

Supplies.—Rock fish may be caught with hook and line off the east point of Memory cove, and firewood may be obtained in abundance; but no fresh water could be procured, except a few bucketfuls, after heavy rains.

From Memory cove the coast trends North $2\frac{1}{2}$ miles to a point having a detached rock off it; and from thence N.N.W. 5 miles to a long sandy beach, with low land behind it. Nearly the whole of this coast consists of limestone cliffs, forming several small coves; one of which, with 5 fathoms water, lies close to the westward of the point just noticed, and Shag cove, with 3 fathoms water, N.N.W. $1\frac{3}{4}$ from it. Coasters might lie in these little bights out of the influence of the tide-streams, and sheltered from all westerly winds. The land at the back of the cliffs and the hills also are thickly covered with scrub.

The long sandy beach just mentioned, trends N.E. 2 miles to a rocky point, from whence the coast takes a N.N.E. direction for 2 miles to Maclaren point, which projects half a mile from the line of coast, and has a bight on either side of it. There is good schnapper ground in 5 or 6 fathoms off this point.

From the bight on the north side of Maclaren point the coast extends 4 miles northward to cape Donnington. At nearly midway between Maclaren point and the cape there is a small islet within half a mile of the shore.

The whole coast from Memory cove to cape Donnington seems safe to approach within half a mile, as there are 13 to 6 and 7 fathoms at that distance from the shore.

THORNY PASSAGE is bounded to the eastward by the north-western part of Thistle island, by Hopkins isle, and the shoal extending from the latter island to Black and Porter rocks; and on the west side by the south-east point of cape Catastrophe and the coast from thence northward towards cape Donnington.

Thorny passage is about $2\frac{1}{2}$ miles wide at its narrowest part, between the south-east point of cape Catastrophe and Hopkins isle, from whence its width gradually increases to about 6 miles between Porter rock and the main-land. Several small islands, which lie between the north-western extreme of Thistle island and the south-east point of cape Catastrophe, so contract the southern entrance of this passage that a width of $1\frac{1}{2}$ miles, with 22 to 25 fathoms, between the south-east point of the cape and Smith isle to the eastward of it, is the only safe ship channel in the southern entrance of Thorny passage. From 20 to 24 fathoms in the southern entrance of Thorny passage the soundings gradually decrease to about 11 fathoms westward of Porter rock.

SMITH ISLE, the southernmost of these small islands, lies E. $\frac{1}{2}$ N. $1\frac{1}{2}$ miles from the south-east point of cape Catastrophe, and S.W. nearly 2 miles from the centre of Hopkins isle; it is of an oval form, and flat-topped, half a mile long, N. by W. and S. by E., and 2 cables broad; it is 70 feet high, and covered with stunted vegetation. Smith isle is steep-to, with more than 20 fathoms water within a cable's length of it.

LEWIS ISLE, N. by W. $1\frac{1}{2}$ miles from Smith isle, differs in aspect from many of the other islands in Thorny passage; this being round, peaked, and 128 feet high, whilst the others are all flat-topped. Lewis isle is a quarter of a mile long, N.N.W. and S.S.E., and little more than 1 cable broad, with 13 and 14 fathoms close to it.

LITTLE ISLET, N.N.W. a little more than half a mile from Lewis isle, is a mass of black granite of irregular form, and about 150 yards in diameter.

CAUTION.—It is dangerous to pass between Little and Lewis isles, as the tide-streams sweep from one to the other at the rate of more than 3 knots, with strong eddies and ripples. It is most probable that H.M.S. *Investigator's* boat was lost between these isles, having been first filled by

the ripple, and then dashed against Little isle. With a strong flood-stream these ripples extend more than half a mile northward from Little isle.*

GRINDAL ISLE, W. by N. $\frac{1}{2}$ N. 4 miles from the north extreme of Thistle island, and 2 miles from the main-land to the westward, is three-quarters of a mile long, North and South, and half a mile broad. It is flat-topped and covered with detached bushes, which seem to spring up from a soil of white limestone lumps, and, although apparently without a blade of grass, the island is used as a sheep run. Some rocks awash, lie off the north-east point, and a coral ledge, with 4 to 7 fathoms on it, extends three-quarters of a mile from the northern end of Grindal isle; but there are 9 to 10 fathoms at 1 cable's length from all other parts of the island.

TAYLOR ISLE, the south point of which lies N.W. $\frac{1}{2}$ W. nearly 2 miles from Grindal isle, is the northernmost and largest island in Thorny passage, it being $1\frac{1}{2}$ miles long, North and South, and about half a mile broad; its summit, which is near the north end, is 227 feet high. Taylor isle is rocky, with its eastern face forming a high cliff; and there is no other beach than a small one at the north-west point. It is mostly covered with scrub; but, the south end being grassy, the island has been used as a sheep run, and there were some rabbits on it in 1863.

A small islet lies 3 cables' lengths off the north end of Taylor's isle, with only 7 feet water between them; and a similar islet lies off the south end of Taylor isle, from which it is separated by only a boat passage. There were some rabbits also on the northern islet in 1863.

Taylor isle is steep-to, except off its north-west side, where a sand-flat extends a quarter of a mile off shore to the northern islet. There is a clear channel $1\frac{1}{2}$ miles wide, with 11 fathoms, between Taylor and Grindal isles; and that between Taylor isle and the main-land, which is $1\frac{1}{4}$ miles wide, with 10 to 8 fathoms, is equally free from dangers.

ANCHORAGE.—There is good anchorage in 9 fathoms, marl, for large vessels, with the South point of Taylor isle bearing S.E., and a high and remarkable striped limestone cliff on the main-land bearing about S.W. There is also anchorage anywhere between Taylor isle and the long beach of the main-land to the north-westward of Grindal isle.

TIDES.—It is high water in Thorny passage, full and change, at 12h.; rise 6 to 8 feet. The tide-streams run North and South, through Thorny

* In these tide-rippings H.M.S. *Investigator*, Captain Flinders, lost her Master, a Midshipman, and six men, by the upsetting or filling of a boat that was crossing over from Memory cove to the ship, at anchor off the north-west side of Thistle island, which renders care and daylight necessary in crossing this track, especially with a weather tide.—*Flinders' Terr. Aust.* vol. i. p. 135.

passage; the springs at the rate of 2 or 3 knots, and 1 knot between Taylor isle and the main-land. In the vicinity of the isles between cape Catastrophe and Thistle island, there are tide ripples, which are so violent as to swamp a boat.

Between Observatory point and Porter rock the flood sets to the north-eastward, and the ebb south-westward about $1\frac{1}{2}$ knots; but at the anchorage about one quarter of a mile eastward of Observatory point, the flood was sometimes found setting to the south-eastward, and the ebb north-westward, at about half a knot at springs, but with no regularity, the stream frequently running one way all day and night.

DIRECTIONS.—Thorny passage is very seldom used, there being no trade between Port Lincoln and any ports to the westward; and it cannot be recommended to strangers, as the wind frequently dies away in the passage with a south wind outside, and some other wind in Spencer gulf, leaving a sailing vessel to the full influence of the tide-streams in deep water.

A vessel, however, desirous of proceeding northward through Thorny passage, with a strong fair wind, should pass the south-east point of cape Catastrophe at the distance of about 4 cables' lengths, and then steer North or N. $\frac{1}{4}$ W., so as to run between Grindal and Taylor isles.

If it be desirable to enter Thorny passage by the narrow channel between Smith and Hopkins isles, the rock southward of Hopkins isle will be cleared at the distance of half a mile, in 27 fathoms water, by keeping the east side of Lewis isle touching the west side of Grindal isle, bearing N. by W., until cape Catastrophe opens North of Smith isle, bearing W.S.W.

DANGEROUS REEF, about E.S.E. $11\frac{1}{2}$ miles from cape Donnington, and N.N.E. $\frac{3}{4}$ E. nearly 9 miles from the north extreme of Thistle island, is a group of rocks partly above water, the extent of which is not exactly known, but it does not appear to exceed $1\frac{1}{2}$ miles; the central rocks of this reef have been seen from the deck of the *Yatala* at the distance of 6 miles. There are 16 fathoms at E.N.E. $3\frac{1}{2}$ miles from Dangerous reef, the water deepening to 25 fathoms at 6 miles farther to the eastward. There is reported to be a safe channel between the north extreme of this reef and the southern isles of Sir Joseph Banks group, which lie to the northward; but until it is better known a vigilant look-out must be kept in that locality.

A SHOAL of doubtful position, is shown on the Admiralty charts as lying nearly midway between the southern extremes of Dangerous reef and Taylor isle, and N.N.W. $2\frac{1}{2}$ miles from Porter rock.

CAPE DONNINGTON, the south-east entrance point of Port Lincoln,

is the north point of a promontory extending $3\frac{1}{2}$ miles to the northward and 1 mile to $1\frac{3}{4}$ miles across, the coast of the northern end trending about 1 mile westward from the cape. Cape Donnington has a small rock lying half a mile to the northward of it, with 7 fathoms close outside the rock.

PORT LINCOLN is a spacious harbour affording complete shelter from all winds, and having with Boston bay, to the northward, one common entrance from seaward, between cape Donnington and Boston point, a low projection of the main-land lying N.W. $\frac{1}{2}$ N. $5\frac{1}{2}$ miles from the cape.

BOSTON ISLE, which lies in this entrance, with its south-east point bearing West, distant $2\frac{1}{2}$ miles from cape Donnington, is $3\frac{1}{2}$ miles long, N. by W. and S. by E., about 1 mile broad, and moderately elevated and wooded. There is a small bight at its southern end, and it terminates to the northward in the projecting Maria point. This island divides the entrance into three channels, the two southern being the East and West channels into Port Lincoln, and the northernmost the North channel into Boston bay.

EAST CHANNEL is nearly $1\frac{1}{2}$ miles wide between the south-east point of Boston isle and the west extreme of cape Donnington. There are 7 to 9 fathoms, sand and mud, in this channel, and the water appears deep on either side; the depth gradually decreasing to the S.W. and affording good anchorage in every part.

BICKER ISLETS, which lie within East channel, contract the channel to less than a mile in width between them and the south-east point of Boston isle; but they are bold to approach, and have 5 fathoms close to the northward of them. These islets are two in number, lying nearly in line with, and S. $\frac{3}{4}$ E. about a mile from, the south-east point of Boston isle. Between the southern Bicker islet and Surfleet point, one-third of a mile to the southward of it, is a channel one quarter of a mile wide, with 3 to 4 fathoms, and is quite safe, by avoiding the south-east side of the isle, which has a 2 fathoms shoal extending one-fifth of a mile from it.

SPALDING COVE is a deep bight between cape Donnington and Surfleet point, $1\frac{3}{4}$ miles wide at the entrance, and $2\frac{1}{2}$ miles deep, with a sandy beach at its head. According to Captain Flinders, Spalding cove is capable of sheltering a fleet of ships, should there be—as appeared very probable—sufficient depth of water. There was wood; but no water could be found in Spalding cove.

WEST CHANNEL, the junction between Port Lincoln and Boston bay, is $1\frac{3}{4}$ miles wide from the south point of Boston isle W. by N. $\frac{1}{4}$ N. to Kirton point. There are 7 and 8 fathoms in this channel and $5\frac{1}{2}$ fathoms on a bank extending half a mile from the point.

THE TOWNSHIP of Port Lincoln is situated on Kirton point, on the

north side of which is a bight with 5 fathoms at about half a mile from the shore ; on the south side of the point is Porter bay, which is about three-quarters of a mile in extent.

The SOUTHERN SHORE of Port Lincoln from Surfleet point, trends S.W. $4\frac{1}{2}$ miles, and West 1 mile, to a point at about half a mile off, which is a small islet, connected with the point by a shoal. The shore from thence curves round westward to the south-west bight, or head of the port, where H.M.S. *Investigator* anchored in 4 fathoms, mud, at 1 mile from the beach and somewhat less from the south shore.

The NORTHERN SHORE of Port Lincoln from the south-east point of Porter bay, trends S.W. 2 miles, when it turns about a mile to the N.N.W., forming a broad projecting piece of land, and from thence extends S.W. $4\frac{1}{2}$ miles to the head of the port.

GRANTHAM ISLE, which is less than a mile long, N.E., and S.W., lies half a mile off the south-west point of the projecting piece of land just noticed, to which it is joined by a shoal. This island contracts Port Lincoln to $1\frac{3}{4}$ miles in width, whilst outside and within the island the width is 2 and 3 miles.

From 8 and 9 fathoms, in the entrances of Port Lincoln, the soundings gradually decrease to 5 and 4 fathoms at about half a mile off Grantham isle, on a very even bottom of soft mud, except on one spot nearly in mid-channel to the south-eastward of the island, where the depth is $3\frac{1}{2}$ fathoms. From abreast of Grantham isle to the head of Port Lincoln the depth gradually decreases from 5 to 3 fathoms, on a soft bottom.

The southern side of Port Lincoln is bordered by shoal water extending one quarter of a mile to half a mile from the shore ; it runs out, however, much farther from the northern shore, between Grantham isle and the head of the port ; but the bottom is everywhere mud, and there is no difficulty in communicating with the beach.

Water.—Captain Flinders procured water by digging pits at about 100 yards behind the beach at the head of Port Lincoln, and, although discoloured by whitish clay, through which it passes, the water had no injurious quality, nor was it ill-tasted. Water and wood were all that Captain Flinders found of use to ships.

RESCUE from SHIPWRECK.—In the event of a vessel being stranded at or near Port Lincoln, and the lives of the crew being in danger, assistance will, if possible, be rendered from the shore, as directed at page 54.

ASPECT.—The country about Port Lincoln is represented as being rocky and barren, but with a sufficient quantity of grass, bushes, and small trees, not to look desolate. No part of it rises to any very considerable elevation, but on the southern side of the port, at about 1 mile to the

westward of Spalding cove, Stamford hill, a range about 2 miles long, rises to a moderate height, and when viewed from North or South assumes a conical form. At 4 miles south-westward of Stamford hill is a pond of brackish water near the shore.

On the north-western side of Port Lincoln, at 3 miles south-westward of Kirton point, is North-side hill, a remarkable peak of small elevation, behind which the country is covered with wood, but is apparently stony. This hill is the south end of a long range of moderately high land of barren appearance, that limits the mast-head view of the interior country from Spencer gulf.

Winters hill, $3\frac{1}{2}$ miles to the northward of North-side hill, is 900 feet high, and appears to have a ridge extending to the north-westward.

WINDS.—In February and March, Captain Flinders found the weather generally cloudy, and the winds light, coming from the eastward in the morning, and from the southward afternoon.

TIDES.—From Captain Flinders' tidal observations in Port Lincoln, it appeared that the rise did not exceed $3\frac{1}{2}$ feet, and that there was, as in Princess Royal harbour, only one high water in 24 hours, which took place at night, about 11 hours after the moon's passage over the meridian, or one hour before it came to the lower meridian; yet in Thorny passage, only 15 miles to the southward of Port Lincoln, there were two sets of tide in the day. This difference, in so short a space, appears extraordinary; but it may perhaps be accounted for by the direction of the entrance of the port, which is open to the N.E., from whence the ebb comes.*

BOSTON BAY extends from its south entrance N.N.W. $8\frac{1}{2}$ miles, and is about 3 miles wide; its southern half, which appears by the chart to be the only part surveyed, has 7 to 10 fathoms, and affords sheltered anchorage.

The northern entrance into Boston bay, between Boston and Maria points, is about $1\frac{1}{2}$ miles wide; but some rocks, named Yatala reef, extend a quarter of a mile northward from Maria point, with 4 fathoms close to them, and from thence trend in an E.N.E. direction $2\frac{1}{2}$ miles, having 4 and 5 fathoms near them. This reef generally consists of patches, with small channels, having 4 and 5 fathoms in them, between the rocks.

DIRECTIONS.—To avoid Yatala reef, incline more towards Boston than to Maria point, not approaching the latter under 7 fathoms; or keep North-side hill open of Maria point, bearing S.W. $\frac{1}{2}$ S. until Kirton point, the low point eastward of the town, is well open of Maria point, when the anchorage may be approached in safety. Vessels of great draught should anchor in 4 fathoms.

* Captain Flinders' *Terr. Aust.* vol. i. p. 150.

Hitherto the tower of a windmill kept open of Maria point, has been considered a safe mark for entering Boston bay by the northern entrance. A very careful examination, however, proves that it leads too closely to the rocks off Maria point; North-side hill open of the point is therefore preferred. At night no danger need be apprehended in approaching Boston point within a reasonable distance, as the water is deep, although the point itself is rather low.

LOUTH BAY is a deep bight extending from Boston point N.E. $\frac{1}{4}$ N. 11 miles to Bolingbroke point; it is separated from Boston bay by a peninsula projecting nearly five miles south-eastward from the line of coast to Boston point. From this point, which has a detached rock near the shore, at $1\frac{1}{2}$ miles to the northward of it, the shore trends N.N.W. $3\frac{1}{2}$ miles, when it curves round 1 mile westward into the south-western bight of Louth bay. From thence the shore extends nearly N.N.E. 10 miles to the northern bight of the bay, and then turns S.E. $\frac{3}{4}$ E. nearly 9 miles to Bolingbroke point. A small rocky point projects a short distance from the middle of the western shore.

LOUTH ISLES are low, and two in number, lying in Louth bay; the larger isle bearing North, distant 6 miles, and the smaller one N.N.E. $\frac{3}{4}$ E. $4\frac{1}{2}$ miles, from Boston point. The larger isle appears by the chart, to be $2\frac{1}{2}$ miles long, North and South, and half a mile broad, with its northern end connected with the western shore of the bay by a shoal; the smaller isle, which is a mere islet barely a quarter of a mile in extent, has a spit extending to the northward. No soundings are recorded as having been obtained in Louth bay.

ASPECT.—Mounts Gawler, Knott, and Liverpool are three summits of a range of hills, bearing respectively N.W. $\frac{1}{2}$ N., distant 11 miles, N.N.W. $\frac{1}{2}$ W. 13 miles, and N. $\frac{1}{4}$ W. 16 miles from Boston point; the first is 800 feet, the second 900 feet, and the third 800 feet high. From mount Liverpool the range appeared to trend about 10 miles to the north-eastward. Todd river skirts the western base of these hills, and flows into the south-western bight of Louth bay.

There are soundings in 9 to 12 fathoms from 2 miles off Boston point to about the same distance off Bolingbroke point.

WEROON INLET and TUMBY ISLE.—The coast from Bolingbroke point trends N. by E. $6\frac{1}{2}$ miles to Weroon inlet, a good haven for small craft, at about 1 mile off which lies Tumby isle, that appears to be about half a mile in extent.

SIR JOSEPH BANKS GROUP, to the north-eastward of Louth bay, consists of twelve, mostly low, small islands and three rocks above water, extending from 22 miles E. by N. of cape Donnington to 12 miles

N. E. by E. $\frac{1}{2}$ E. of Bolingbroke point, and from 5 to 12 miles eastward of the point, with apparently clear channels between them.

REEVESBY ISLE, the largest of the group, and of which the southern point lies E. $\frac{1}{4}$ N. 11 miles from Bolingbroke point, is nearly 5 miles long, N. by E. and S. by W., and 2 miles broad at its northern end. It is low and sandy, except at its northern and southern extremes.

BUFFALO REEF, discovered by H.M.S. *Buffalo* in 1836, appears to be the most prominent danger of Sir Joseph Banks group. It is low, and bears E. by N., distant 22 miles from cape Donnington.

SPILSBY ISLE, the second in size of the group and the nearest to Buffalo reef, bears from it W.N.W., distant nearly 6 miles. Stickney, Sibsey, and Langton isles lie, respectively, W.S.W. $3\frac{1}{2}$ miles, West 8 miles, and N.W. $\frac{1}{2}$ W. $4\frac{1}{2}$ miles from Spilsby isle. These three are mere islets, apparently not exceeding half a mile in extent. A rock lies $1\frac{1}{2}$ miles north-eastward of Sibsey isle, and another rock lies 1 mile north-eastward of Langton isle.

HAREBY, DALBY, and LUSBY ISLES lie, respectively, S. by W. $\frac{1}{2}$ W. 2 miles, W. by S. $\frac{1}{2}$ S. 4 miles, and W. by N. 2 miles from the southern point of Reevesby isle. Hareby and Lusby isles have each a shoal extending about a mile northward from it.

PARTNEY, MARUM, and WINCEBY ISLES lie, respectively, S.W. 2 miles, West $1\frac{1}{2}$ miles, and North 1 mile from the north-west point of Reevesby isle, and, like the greater portion of the group, are mere small slets, apparently less than half a mile in extent.

KIRBY ISLE, the westernmost of Sir Joseph Banks group, lies East 6 miles from Bolingbroke point, with 10 fathoms in mid-channel between them. This isle, which is about 1 mile long, East and West, was visited by Captain Flinders, who found it destitute of trees and almost of shrubs; although there were marks of its having been frequented by geese, none were seen on the island, nor any other kind of animal, except a few hairy seals upon the shore. This description, unfavourable as it is, seemed applicable to all the group, with the exception of Reevesby and Spilsby isles, which are higher and of greater extent and probably somewhat more productive.

Any farther knowledge that may be required of Sir Joseph Banks group will be better obtained by a reference to the Admiralty charts than from any written directions.

HARVEY BAY extends from the south-east head of Weroon inlet N.N.E. $\frac{1}{2}$ E. 12 miles, and is about 3 miles deep.

LIPSON COVE and ISLET.—From the north-east extreme of Harvey bay the coast sweeps round northward, about 1 mile, to Lipson cove, close off which is Lipson islet. The cove has a sheltered sandy beach, with water holes near it; and Sheep-hill cove, about 1 mile to the northward of the islet, appears to have similar advantages.

From Lipson cove the coast trends N.N.E. $3\frac{1}{2}$ miles to cape Hardy, and from thence nearly 5 miles in the same direction to cape Burr. From the hilly land immediately behind Lipson cove, a coast range, named Sheep hills, extends to cape Burr.

DUTTON BAY.—The coast from cape Burr recedes about $1\frac{1}{2}$ miles north-westward to Mottled cove, where there is good anchorage. There is a small lagoon at the back of Mottled cove, apparently receiving a little stream from the west side of Sheep hills. From Mottled cove the shore of Dutton bay trends $4\frac{1}{2}$ miles northward to Salt lagoon, which forms the mouth of Dutton river, and from thence curves north-eastward 7 miles to the north-east extreme of the bay; behind which are salt lagoons, where Driver river terminates, from the north-westward.

SALT CREEK COVE.—From the north-east extreme of Dutton bay the coast extends N.E. $\frac{1}{4}$ E. 7 miles to cape Driver; at about 1 mile to the north-westward of which is Salt Creek cove, a small inlet, having only 6 feet on its bar at high water. There is a small lagoon behind the creek, but there is no passage between them.

From Salt Creek cove a low line of sandy beach extends N.E. by E. $\frac{1}{4}$ E. 19 miles to Germein point, the eastern entrance point of Franklin harbour.

All the headlands between Harvey bay and Franklin harbour have reefs, some, but not many of them, projecting to the distance of half a mile; beyond these the water is deep and safe. Between these points there are excellent coves with hard sandy beaches.

SOUNDINGS.—From Kirkby isle, the westernmost of Sir Joseph Banks group, there are regular soundings in 10 to 15 fathoms at 5 to 6 miles from the coast; and there are 12 and 13 fathoms at 16 miles off Dutton bay.

ASPECT.—Mount Hill, to the westward of Dutton bay, and N.W. by W. $\frac{1}{2}$ W. $9\frac{1}{2}$ miles from cape Burr, is 1,600 feet high, and appears to form the beginning of a range of considerable elevation, and mostly of uniform aspect, extending in a north-east direction about 37 miles to mount Parapet, which is 1,500 feet high. The intermediate summits of this range most worthy of notice, appear to be a Remarkable cone, 700 feet high, bearing N.N.E. $\frac{1}{2}$ E., distant 18 miles, and a hill, 400 feet high, N.E. $\frac{1}{2}$ N. 17 miles from Mount Hill.

Elbow hill, S. by W. $4\frac{1}{2}$ miles from mount Parapet, is 800 feet high, and derives its name from its forming the southernmost of a chain of hills stretching across the range just noticed, and terminating northward at mount Olinthus, which bears N. $\frac{1}{2}$ W., distant 6 miles from mount Parapet. A small river from the north-westward appears to pass on the west side of Elbow hill towards a good water-hole behind the beach, $3\frac{1}{2}$ miles to the south-eastward of the hill.

The country westward of Mount Hill is low and undulating, and between
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the Remarkable cone and Elbow hill it is grassy ; but there is scrub between the range and Salt Creek cove.

FRANKLIN HARBOUR is but little known, except to the very few coasters which go there occasionally ; but it may be recognized by bearings of Elbow hill and mount Parapet, and by the remarkable red cliff of Victoria point, on the west side of the harbour, which bears E. $\frac{1}{4}$ N., distant 10 miles from Elbow hill, and rises in bold relief to the long low line of sandy beach which forms this part of the coast. There are 6 to 9 fathoms at 4 miles off the entrance.

Franklin harbour never having been minutely surveyed, the only description that can be given of it is that a sand-spit runs out about 3 miles in a southerly direction from Germein point ; and the entrance, which is estimated at about half a mile in width, has a bar, with 12 feet on it at low water, over lumps of sand and sea-weed, on which in bad weather, the sea breaks heavily. The harbour is about $7\frac{1}{2}$ miles long, N.E. by E. $\frac{1}{2}$ E. and S.W. by W. $\frac{1}{2}$ W., and nearly 3 miles wide at its north-eastern end, which is immediately to the northward of the entrance.

DIRECTIONS.—As, during very bad weather from the southward, the sea must break with great violence on the bar of Franklin harbour, owing to the deep water close outside allowing the swell to roll suddenly on the shoals, great caution is necessary in approaching the harbour ; which, without buoys or beacons, is only calculated to allow safe ingress to vessels not drawing more than 10 feet, unless the time of high water is correctly calculated, when a vessel of somewhat heavier draught might attempt it.

A vessel entering Franklin harbour, when in 7 fathoms, at about 4 miles off shore, should bring the western part of the red cliff on Victoria point to bear North, and steer directly for it ; on this course the water rapidly shoals to 2 fathoms on the bar. Having run in, and inclined more to the westward, according to the depth of water, steer N.N.W., keeping along the eastern edge of Germein point spit, which will be distinctly seen from aloft ; after having crossed the bar the depth increases to 3 fathoms.

When off Germein point, steer in mid-channel for a rocky point, which will then bear about N.W. ; a tide ripple will here be observed across the channel, close on the north side of which will be found 3 fathoms, when the depth suddenly increases to 7, 8, and in some places 11, fathoms, on a rocky bottom. This may be considered the best anchorage, though some attention is necessary to prevent a vessel from breaking her sheer, as the tide stream runs with great velocity in this part of the harbour.

Above the rocky point the water rapidly shoals to $2\frac{1}{2}$ fathoms on a sandy bottom, with a channel only adapted to coasters, on the east side towards the head of the bay, the centre of which is encumbered with an extensive sand-bank, that dries in some places at low tides.

In working in or out of Franklin harbour, when in the inner part of the channel, the following marks will be found useful :—A mangrove point on the eastern side of the bay, within the anchorage, kept open of the rocky point, clears the east beach ; and Germein point open of the rocky point clears the western shoal. The usefulness of these marks is, however, limited to the inside portion of the bar channel; the outer part must be found by a rapid use of the lead and the appearance of Germein point spit, which clearly shows itself from a considerable distance.

Water.—In 1857 no fresh water had been procured nearer Franklin harbour than 10 miles inland of the landing place ; but according to the Admiralty chart, there is a stream of excellent water at about 3 or 4 miles from the northern shore of the harbour, behind a moderately elevated range of level land, extending more than 20 miles in an E.N.E. direction from the chain of hills between mount Parapet and Elbow hill. This stream takes an easterly course from mount Parapet, and after its junction with another stream flowing from the foot of mount Olinthus, appears to discharge itself into the north-east corner of Franklin harbour ; and a smaller stream is represented on the chart to flow into the western end of the harbour, from mount Parapet.

TIDES.—It is high water in Franklin harbour, full and change, at about 7h. 30m., with only one tide in 24 hours ; the rise, from tide-marks on the banks, seems to be from 10 to 12 feet.

The COAST from Victoria point consists of a low, sandy, but wooded shore, extending E. by N. $\frac{1}{2}$ N. in nearly a direct line for about 13 miles. The coast for the next 6 miles appears not to have been surveyed ; but it is very low, and seems to extend in an easterly direction to a sandy beach, of which the general trend is N.N.E. about 15 miles to Plank point.

For nearly 13 miles to the eastward from Victoria point the land rises gradually to the range of level land extending eastward from the back of Franklin harbour, and the coast appears to be bordered by a shoal extending about $1\frac{1}{2}$ miles from the beach ; but from 4 miles off Victoria point a line of soundings, in 9 to 6 fathoms, extends nearly 20 miles in an E. by N. direction, between 4 and 5 miles from the shore.

The sandy beach trending about N.N.E. 15 miles to Plank point has low scrubby land behind it, and is fronted by a sand-flat extending about 1 mile from the shore ; beyond this flat there are irregular soundings in 2 to 5 fathoms, the outer 3-fathoms edge of the shoals being about 4 miles from the land.

PLANK POINT, nearly N.E. by E. $\frac{1}{4}$ E. 39 miles from Elbow hill, may be easily known by three sand-hills along the coast, the point being close to the northernmost ; the southernmost and most conspicuous hill is 56 feet

high, and is the most elevated part of the coast between Franklin harbour and mount Young, to the north-eastward.

From Plank point the coast takes a general N. by E. $\frac{1}{4}$ E. direction 21 miles to the foot of mount Young, and forms a shallow bay immediately to the southward of the mount. The shore consists either of beach or mangrove bushes, fronted the whole distance by shoal water, extending in some parts about 2 miles from the shore, the water shoaling quickly from 7 and 8 to 2 and 3 fathoms.

MOUNT YOUNG, which is the most prominent feature of this part of the western coast of Spencer gulf, bears N. by E. $\frac{1}{4}$ E., distant 21 miles from Plank point; it rises steeply to the height of 475 feet, from the low land on all sides of it. This hill, which, when seen from a distance, makes out as a double peak, is situated $1\frac{1}{2}$ miles from the nearest part of the mangrove coast; the intermediate space being mostly occupied by swamps, which extend along the coast to Hummock hill, 6 miles to the north-eastward, and as far to the southward as the eye could trace. The country inland of mount Young is an extensive plain, gradually rising to the westward and covered with stunted scrub.

MIDDLE-BACK MOUNT, nearly W. by S. $\frac{1}{2}$ S. 18 miles from mount Young, is 1,519 feet high, and is the summit of ranges of hills extending from about 10 miles westward of Plank point to 18 miles W. by N. $\frac{1}{2}$ N. of mount Young; but they are too distant to be of any great service to passing vessels. Between this range and the shore there are other ranges of hills of less elevation, besides those already noticed.

WESTERN SHOAL.—A sandy patch about half a mile in extent, and which dries, lies 2 miles from the shore in the shallow bight immediately to the southward of mount Young; and from this patch the shallow part of Western shoal extends in an East and E.N.E. direction 3 miles, with not more than 3 feet on it at low water, but having a 2-fathoms channel between it and the sand-patch fronting the shore. The 5-fathoms edge of Western shoal extends about $3\frac{1}{2}$ miles south-eastward from the sandy patch, and then sweeps round northward to about 2 miles off Hummock hill, there being 3 fathoms on the outer edge at E. by S. $\frac{3}{4}$ S. $5\frac{1}{2}$ miles from mount Young.

DIRECTIONS.—After sighting mount Young, which may be seen from the parallel of Plank point, the shoal water fronting the western coast in the vicinity of the point, will be cleared by keeping the mount to the westward of North, until Hummock hill is distinguished, when by keeping it to the westward of North, the Western shoal will be cleared to the eastward in 3 fathoms.

The coast from $1\frac{1}{2}$ miles southward of mount Young trends N.E. $\frac{3}{4}$ N. $7\frac{1}{2}$ miles to Hummock Hill point; it is very low and swampy for some

distance inland, and has a fringe of mangrove bushes along shore, with sand-flats, which dry at low water, springs, at half a mile to 1 mile off shore.

HUMMOCK HILL, N.E. $\frac{1}{4}$ E. $6\frac{1}{2}$ miles from mount Young, is round and grassy, and rises from a point of the coast to the height of 201 feet above high water. The point has a shingle beach, with sand-flats extending half a cable's length off it, and 4 fathoms at half a mile from the shore.

MOUNT LAURA, N. by E. $\frac{1}{2}$ E. $6\frac{1}{2}$ miles from mount Young, is situated on a ridge extending north-westward from Hummock hill, and rises to the height of 596 feet; it is a sharp wedge-shaped hill, with its west face nearly perpendicular.

FALSE BAY extends from Hummock hill point N.E. by E. $\frac{1}{4}$ E. 7 miles to Black point, and is $3\frac{1}{2}$ miles deep, with 4 or 5 fathoms in the centre, and the water gradually decreasing in depth towards the head of the bay. Black point, however, is nearly steep-to, with 4 or 5 fathoms at 2 cables' lengths off shore. The shore of False bay is fronted by a sand-flat, which dries at low water, and extends, in some places, more than a mile off shore; but the bay affords good anchorage, with northerly and westerly winds.

The land at the head of False bay is very low and swampy, and continues so for many miles inland, so that to vessels running up Spencer gulf, the bay presents the appearance of an opening before the entrance of the head of the gulf makes out.

TIDES.—It is high water in False bay, full and change, at 7h.; springs rise 6 to 8 feet. At half a mile off Black point, in 5 fathoms water, the flood sets East and the ebb West about 1 knot; at about half a mile off Hummock point the streams set North and South.

BLACK POINT, the north-eastern extreme of False bay, is formed of a limestone cliff about 50 feet high, and, although the cliff is of a light colour, its overhanging face, having a southern aspect, is nearly always in shadow and appears black.

From Black point the coast trends E. $\frac{1}{2}$ S. 3 miles to point Lowly, and is bordered by a rocky ledge extending about $1\frac{1}{2}$ cables' lengths from high-water mark. There is a patch with $4\frac{1}{4}$ fathoms on it, at about 1 mile off shore, midway between Black point and point Lowly, with 10 fathoms between the patch and the latter point.

FAIRWAY BANK, on which the least water is 4 fathoms, lies nearly in mid-channel off False bay, with its north-eastern end S.W. $\frac{1}{2}$ S. 4 miles from point Lowly; it is 3 miles long, N.E. by N. and S.W. by S., and three-quarters of a mile broad. Mount Laura and Hummock hill in line, bearing N.W. by W. $\frac{1}{2}$ W. just clear the south-west end of this

bank in $5\frac{1}{2}$ fathoms. There is a clear channel 3 miles wide, with 6 to 10 fathoms, between Fairway bank and the shoal water of False bay.

EASTERN COAST of SPENCER GULF.—The western coast having been described, from cape Catastrophe to point Lowly, where the gulf is only $8\frac{1}{2}$ miles wide, the navigator's attention will be next directed to the eastern coast, before proceeding farther up the gulf, to Port Augusta.

CAPE SPENCER, in lat. $35^{\circ} 18' 21''$ S., long. $136^{\circ} 54' 33''$ E., is the southernmost of three cliffy points, with sand-hillocks behind them, forming the south-west extreme of Yorke peninsula ; it is 258 feet high, with a ledge of rocks at its base, and from the southward appears like a cone. Reef head, W.N.W. 2 miles from cape Spencer, has a reef extending S.S.W. $\frac{1}{2}$ W. 4 cables' lengths from it. West cape N.W. $\frac{3}{4}$ N. $2\frac{1}{2}$ miles from Reef head, is 190 feet high.

ALTHORPE ISLES are three in number, of which the southernmost, and largest lies S. $\frac{3}{4}$ W. $4\frac{1}{2}$ miles from cape Spencer ; it is 2 miles in circumference, nearly flat-topped, and 305 feet high, with steep sides and a cleft across its southern part, visible from eastward and westward. Dry rocks lie a quarter of a mile West of the south point, and some larger ones half a mile from the west side of the island. A rock, upon which the sea breaks, lies N.W. half a mile from the island, with 9 fathoms between them. There is anchorage in 8 to 10 fathoms, sheltered from westerly gales, on the east side of the island, with its extremes bearing N.N.W. and South ; and in fine weather, landing may be effected upon the sandy beach or the rocks on the north-east side, and in a small cove on the south-east side of the island. The summit of the island is much burrowed by mutton birds and penguins. The south extreme of the island, after passing the rocks West of it, may be rounded within a mile in 20 fathoms ; but when close in, the wind is generally baffling from the westward.

The other two Althorpe isles are bare rocks, lying S.E. $\frac{1}{4}$ S. $1\frac{1}{4}$ miles, and S.E. 3 miles from cape Spencer, the former being 131, and the latter 102 feet high. A sunken rock, upon which the sea generally breaks, lies N.W. 2 cables' lengths from the south-eastern of the two islets.

REEF, W. by S. $\frac{1}{2}$ S. $3\frac{1}{4}$ miles from cape Spencer, is a rocky patch 50 yards across that dries 5 feet at low water springs, and upon which the sea at other times breaks heavily ; there are 17 fathoms at a quarter of a mile from the reef.

S.W. ROCK, upon which the sea only breaks at intervals during a heavy swell, or in a westerly gale, lies N.W. by W. $\frac{1}{2}$ W. 3 miles from the centre of the largest Althorpe isle.

TIDES.—At South Althorpe isle the flood sets N.W. and the ebb South.

SOUNDINGS.—There are 35 to 45 fathoms at 8 or 9 miles to the westward and southward of the largest Althorpe isle, and 22 fathoms at 6 miles to the eastward of it. From cape Spencer to the Foul ground south-eastward of Gambier isles there are 20 to 35 fathoms.

PANDALOWIE, so called by the natives, is the northern of two small bays between West cape and Royston head, a clifly point 195 feet high, bearing N. by E., distant 3 miles from West cape. A steep rocky islet, 80 feet high, lies close off the head, with which it is connected by a reef. From Royston head Pandalowie bay extends $2\frac{1}{2}$ miles to its southern bight, its eastern shore being a sandy beach backed by high sand-hills. A reef of sunken rocks, upon which the sea breaks in south-west gales, projects from a clifly head just outside of the south point of Pandalowie bay, to three-quarters of a mile N.N.W. of West cape.

The entrance of Pandalowie bay, which is nearly three-quarters of a mile wide, with 6 fathoms water, lies between the South and Middle islets; the former islet is small, and connected at low water with the south point of the bay; and the latter, which lies to the northward of South islet, and S. by W. $\frac{1}{2}$ W. $1\frac{1}{4}$ miles from the North islet, close off Royston head, is half a mile long, W.N.W. and E.S.E., and is 94 feet high, with a reef of dry and covered rocks projecting W.N.W. 4 cables' lengths from its western point, and a reef of sunken rocks extending one cable's length from the middle of its south side. A rock, with 7 feet water on it, upon which the sea breaks at intervals in south-west gales, lies close within the entrance, with the outer extreme of the South islet bearing S.W. $\frac{1}{2}$ S., distant $3\frac{1}{2}$ cables' lengths, and the highest sand-hill on the beach S.E. by E. $\frac{1}{2}$ E. The channel between the Middle islet and the shore is rocky, with only 2 fathoms water in it.

The three islets fronting Pandalowie bay, which are the Black rocks of Flinders, being of a dark-coloured limestone on their western aspect, appear in the forenoon, quite black when seen from seaward against the sand-hills on the shore.

DIRECTIONS.—Vessels approaching Pandalowie bay from the southward, should keep the cliffs of Reef head open to the south-westward of West cape, bearing S.E. $\frac{1}{2}$ S., to clear the reef which projects N.N.W. from the cape. And any small vessel entering the bay between South and Middle islets should, to avoid the sunken rock in it, and the reef on the south side of Middle isle, run in with the high sand-hill just open to the northward of the South islet bearing E. by S., passing the islet, which is steep-to, within a cable's length.

Pandalowie bay would afford good shelter in $3\frac{1}{2}$ fathoms for a small vessel, with any winds from North round by East to W.S.W., at a quarter

of a mile off shore, but there is no good holding-ground, the bottom being smooth limestone with a thin covering of sand.

STURT BAY.—From Royston head a succession of small sandy beaches and rocky points extends N.E. by N. 8 miles to the bight of Sturt bay, and from thence a sandy beach trends N.W. by N. 4 miles to Daly head, which bears N. by E. $\frac{1}{2}$ E., distant $10\frac{1}{2}$ miles from Royston head. The whole of the coast between the two heads is backed by high sand-hills, and the points have generally rocks extending one or 2 cables' lengths from them. A rock upon which the sea breaks heavily, except in very fine weather, and with easterly winds, lies N.N.E. $\frac{1}{2}$ E. $3\frac{1}{2}$ miles from Royston head, at a little more than a mile from the shore.

DALY HEAD is steep and rocky, with a grassy summit 207 feet high : a reef, partly dry 4 feet above water, projects half a mile westward from the head. The country behind Daly head, to the northward, is low, with several salt swamps and small grassy plains, with some wells of good water within the hills. This part of Yorke peninsula is occupied during the summer months by sheep stations.

From Daly head the coast curves slightly N. by E. $\frac{1}{2}$ E. $5\frac{1}{2}$ miles to the southern point of a sandy bay, which extends from thence N.N.E. $\frac{1}{4}$ E. $3\frac{1}{4}$ miles to Corny point. Two reefs project one-third of a mile from a rocky point at 1 mile N.E. $\frac{1}{2}$ N. of Daly head, and there are several rocks within a quarter of a mile of the beach to the northward. At N.N.E. 4 miles from Daly head is a rocky point, off which are two detached rocks, always above water, the outer one being three-quarters of a mile off shore. The coast between Daly head and Corny point is generally sandy, and from immediately to the northward of the head, a range of high sand-hills extends along the beach.

WEBB ROCK, on which the barque *Tomatin* struck, lies N. by W. $3\frac{1}{4}$ miles from Daly head, and S.W. by S. $6\frac{1}{2}$ miles from Corny point : it has generally heavy breakers upon it, but during the summer months, after long continued easterly winds, the sea only breaks slightly on it at intervals. A knob of the outer part of the rock is awash at low-water, springs.

CORNY POINT, the south-west point of Hardwicke bay, is a double sloping rocky projection, in lat. $34^{\circ} 54' 3''$ S., long. $137^{\circ} 2' 33''$ E.: the coast to the southward is higher than the point itself; but to the northward it is low and sandy, the only dangers about the point being some rocks above water to the south-westward, which do not extend beyond a quarter of a mile from the shore.

DIRECTIONS.—Corny point may be safely rounded within half a mile, in 9 to 10 fathoms, the only dangers about it being the rocks which pro-

ject a quarter of a mile to the south-westward from it. But after rounding the point into Hardwicke bay, a vessel should keep farther from the shore, as the water quickly shoals when within Corny point, and for the first 2 miles, a large vessel should not bring the point to the westward of W.SW.

HARDWICKE BAY extends from Corny point N.E. by N. 28 miles to the south point of Wardaing isle, and is 18 miles deep, expanding Spencer gulf to the width of 72 miles. From Corny point, the southern shore of Hardwicke bay, which consists of a sandy beach, backed by gently rising woody land, curves eastward $12\frac{1}{2}$ miles to Southar point, on which is a sand-hill, partly white and 85 feet high. At 4 miles eastward of Corny point are some shepherds' huts, and a well of good water at half a mile from the beach. There is anchorage in $4\frac{1}{2}$ fathoms North of the huts, with Corny point bearing W. by S. $\frac{1}{2}$ S.

A spit with 6 to 9 feet water on it, projects 2 miles northward from a low sandy point at 4 miles westward of Southar point. From this spit a 4-fathoms bank extends 6 miles to the north-eastward. There is good shelter, with smooth water, in $3\frac{1}{4}$ fathoms, between the spit and Southar point, at half a mile from the beach. From Southar point the coast trends E. by S. 1 mile, and then curves round to Turton point, a cliffy projection at E.S.E. $4\frac{1}{2}$ miles from Southar point. There are 3 to 4 fathoms water at half a mile from the shore, which consists of small stony beaches and low limestone cliffs.

From Thurton point a sandy beach, forming the bight of Hardwicke bay, curves round 5 miles in an E.N.E. direction, with low sandy land extending between two wooded ranges, in a S.S.E. direction, and forming the narrowest part of Yorke peninsula, which is there only 8 miles across. Mount Gore, S. $\frac{1}{4}$ E. $5\frac{1}{2}$ miles from Southar point, is 306 feet high. From the bight of Hardwicke bay the eastern shore extends 26 miles northward to Gawler point, and consists of sandy beaches and low rocky points, with a coast range of sand-hills, behind which the country gradually rises to the height of 500 feet at about 5 miles inland.

The general depth of water in Hardwicke bay is 8 to 12 fathoms, there are, however, some rocky patches, with only 6 or 7 fathoms in the middle of the bay, between which and Corny point there are 16 to 6 fathoms. In the northern part of the bay there are 7 to 9 fathoms, between 4 and 5 miles off shore : and between 5 and 10 miles south-westward of Wardang isle there are very irregular soundings in 10 to 6 and 16 fathoms, on a sandy bottom.

ANCHORAGE.—Vessels may anchor in many parts of Hardwicke bay, sheltered from all southerly winds, which are the only ones that seem to

blow with much strength. But the best anchorages appear to be those before mentioned, off the huts eastward of Corny point, and between Southar point and the spit to the westward of it, where there is soft good holding ground ; along the east shore, however, it is bad, as the bottom is rocky under sand. There is good fishing ground for schnapper off Corny point, and mackerel abound in the bay.

TIDES.—It is high water on the south shore of Hardwicke bay, full and change, at 2 h. 45 m. ; springs rise $4\frac{1}{2}$ feet, the morning tide being much higher than that in the afternoon. The flood stream sets to the eastward and the ebb to the westward.

GAWLER POINT and BAY.—Gawler point is low, sloping and grassy, from whence the bay extends N.W. $\frac{1}{2}$ W. 4 miles, and from the entrance runs in $3\frac{1}{2}$ miles to the low land to the northward. The water in the bay is shallow, but there are 4 and 5 fathoms, sand, at $1\frac{1}{2}$ miles to the N.N.W. and West of Gawler point, with shelter from all winds except those from between W.S.W. and South ; but the holding ground is not good, and the north-west and westerly gales almost invariably terminate with a gale from S.W., which would make this a dangerous anchorage.

WARDANG ISLE, of which the south point lies W. by S. $\frac{1}{2}$ S. 6 miles from Gawler point, is 4 miles long, North and South, 2 miles broad, and rises to a grassy surface 107 feet high towards its west side, which consists of a succession of small sandy beaches and rocky points, with sand-hills towards the north end of the island, where there are some remarkable cliffy points.

GOOSE ISLET, which is small and grassy, lies 4 cables' lengths off the north point of Wardang isle, with which it is connected at low water. Two small dry rocks lie 2 cables' lengths to the northward of the islet.

With the exception of a red cliff within a mile of the north point of Wardang isle, its eastern side forms a continuous sandy beach, from the middle of which a sandy spit, intersected by three narrow boat channels, stretches $3\frac{1}{2}$ miles in an E.N.E. direction. Between Rocky islet—which is situated on the eastern end of this spit—and the north-western point of the bay, northward of Gawler point, is a channel half a mile wide, with 6 to 9 feet water, leading from the bay into Port Victoria to the north-westward.

ISLAND POINT, which forms the north-east side of the northern entrance of Port Victoria, is a low grassy projection at N.E. 2 miles from Wardang isle, and has a small islet lying half a mile off it, the islet being connected with the point at low water.

BEATRICE ROCK, N. by W. 7 cables' lengths from Island point, has a small portion dry at low water ; but it does not show at high water.

Another small rock, which dries 3 feet at low water, springs, lies W. by S. $\frac{1}{4}$ S. nearly 1 mile from Island point, and from its position, near the entrance, is dangerous to vessels working into Port Victoria.

PORT VICTORIA, which lies between Wardang isle and Island point, is protected from the southward by the long sandy spit which projects E.N.E. from the east side of the island. Green islet, which lies E.N.E. $1\frac{1}{2}$ miles from the red cliff on the north-east extreme of Wardang isle, is connected at low water with the eastern shore of the port. This harbour affords anchorage in $3\frac{1}{2}$ to 4 fathoms, with good holding ground of ooze, well sheltered from all winds except those from between North and N.W.; but it is seldom used, the country in the vicinity being worthless, except for pastoral purposes.

ANCHORAGE.—The best anchorage, recommended for large vessels, in Port Victoria is in $4\frac{1}{2}$ fathoms, sand and mud, with Goose islet bearing West, and the east extreme of Wardang isle South; but smaller vessels may anchor farther in to the southward.

DIRECTIONS.—In running into port Victoria from the westward, the rocks which lie to the northward of Goose islet may be rounded in 4 and 5 fathoms, at the distance of a cable's length; but if it be necessary to make a tack outside Green islet, a vessel should go round before the Rocky islet on the spit comes in line with Green islet, or when the latter islet bears S.E.

Geographical Position.—The shepherd's hut at the southern extreme of the red cliff, at about a mile southward of the north extremity of Wardang isle, is in lat. $34^{\circ} 28' 25''$ S., long. $137^{\circ} 24' 24''$ E. Two townships were laid out at port Victoria in 1839; but they were abandoned, as the place was not considered capable of supporting a population.

TIDES.—It is high water in port Victoria, full and change, at 2 h. 40 m.; springs rise 5 feet, the morning tide being always higher than that in the evening, generally by about 2 feet. The tide stream sets North and South, the flood about $1\frac{1}{4}$ knots to the northward.

REEF POINT, N.N.E. 3 miles from Island point, is low, with a reddish cliff or bank on its west side, and a remarkable white sand-patch at 4 cables' lengths to the southward of it. Ledges of rocks, which dry, extend about 2 cables' lengths to the westward and a quarter of a mile to the northward from the point, with a sunken reef extending N.W. half a mile. Several detached rocks, upon which the sea generally breaks at low water, lie $1\frac{1}{2}$ miles to the northward of Reef point.

Between Reef point and a low rocky projection at N.N.E. 5 miles from it, the low coast forms a sandy bay $1\frac{1}{2}$ miles deep in its southern part; but it is inaccessible to vessels on account of the rocks in it, and the

shoal water which extends nearly 2 miles off shore to the westward. Behind a flat, which dries nearly half a mile off the southern shore of the bay, there are some wells of brackish water, used for watering the sheep of the neighbouring stations.

The low rocky northern point of the shallow bay just described, has a grassy summit and a sandy beach on either side. From this point the coast trends North 3 miles to some low red cliffs in a small open bay, and mostly consists of red cliffs, rising in one place to the height of 54 feet above high water. This part of the coast is more bold than that to the southward or northward, there being generally 3 fathoms within half a mile of the cliffs. The coast from the little open bay just noticed, consists of a sandy beach extending N. by W. $\frac{1}{4}$ W. 4 miles to some bare white sand-hills, close to which are the Tipara wells; but the water is brackish. From the bare white sand-hills a continuation of the sandy beach trends N.N.W. $3\frac{1}{2}$ miles to cape Elizabeth, and is bordered with rocky ledges, which in some places, run out half a mile. There is no anchorage to be recommended between Port Victoria and cape Elizabeth, there being no good holding ground along this coast, which is, moreover, exposed to the westward.

DIRECTIONS.—In working down this coast small vessels generally keep close inshore; but large ones should not approach the bay North of Reef point, within 2 miles, as the water shoals suddenly in some places, from 6 fathoms to less than 6 feet.

Fish is plentiful all along shore, between Port Victoria and cape Elizabeth, principally schnapper, mackerel and whiting.

SOUNDINGS.—There are regular soundings in 25 to 28 fathoms, fine brown sand, across Spencer gulf from Corny point to Dangerous reef, northward of Thistle island. At 3 miles off the reddish cliffs along the centre of the bight between Reef point and cape Elizabeth there are 6 fathoms, from which the depth gradually increases westward, to 17 and 18 fathoms at about 25 miles from the coast.

CAPE ELIZABETH, in lat. $34^{\circ} 8' 30''$ S., long. $137^{\circ} 28' 50''$ E., is a rounding sandy point, clothed with scanty vegetation: a long sandy beach, with rocky ledges stretching out one quarter of a mile to half a mile from the shore, extends S.S.E. $\frac{1}{2}$ E. from the cape; and on its north-east side is a small cliffy point. Close to the southward of the cape are some sand-hills covered with bush, but which from seaward, appear as separate lumps, the highest being 70 feet above high water. The land behind the cape is very low, level, and grassy.*

* See Plan: Tickera point to Cape Elizabeth, including Wallaroo and Tipara bays, No. 402; scale, $\pi = 1.2$ inches.

A ledge of rocks runs out about 3 cables' lengths from cape Elizabeth ; and a dangerous rocky patch, which shows awash at low water, springs, lies with its outer edge, N.W. by W., a little more than three-quarters of a mile from the cape, with a 2-fathoms channel between them ; but it is of no use, as the tide streams rush through it N.E. and S.W. nearly 3 knots.

A *red* pyramidal buoy has been moored in $5\frac{1}{2}$ fathoms, at 4 cables' lengths westward of the shoalest part of the reef, with cape Elizabeth bearing S.E. by E. $\frac{1}{2}$ E., and the light-vessel on Tipara reef N.N.W. $\frac{1}{2}$ W. The buoy may be seen in clear weather, at 4 miles distance.

The SOUNDINGS off cape Elizabeth deepen to 10 and 8 fathoms out to the distance of 4 miles, over a sandy, rocky, or coral bottom ; and at 13 miles off the cape there are 12 and 13 fathoms, mixed sand.

A small 3-fathoms rocky patch lies about N. $\frac{1}{4}$ W. a little more than a mile from cape Elizabeth ; and at N.N.E. between $1\frac{1}{2}$ and 2 miles from the cape is a shoal nearly half a mile in extent, with $2\frac{1}{4}$ to 3 fathoms on it. There are $3\frac{1}{4}$ fathoms between the shoal and the rocky patch, and $3\frac{1}{2}$ to 6 fathoms between the latter and the other rocky patch, before noticed, off cape Elizabeth.

TIPARA BAY extends from cape Elizabeth N. by E. $\frac{1}{2}$ E. 8 miles to Long point, and is 3 miles deep. It has not yet been resorted to by shipping ; but as its eastern shore is only $2\frac{1}{2}$ miles distant from the Moonta copper mines, which were apparently the most valuable and productive on the Yorke peninsula, this fine bay is likely to be soon used as a shipping place for the ore raised, for which purpose it may be made as available as Wallaroo bay to the northward.

From cape Elizabeth the southern shore of Tipara bay trends eastward $2\frac{1}{4}$ miles to the western point of the southern bight of the bay, which curves round eastward and northward 3 miles to Sand-hill point. Rocky ledges project 1 to $1\frac{1}{2}$ cables' lengths from the shore for about $1\frac{1}{2}$ miles eastward from the cape, and there is a small ledge at the head of the bight. The southern shore of the bay is fronted by a sand-flat, which dries half a mile to nearly 1 mile from the land ; and there are some salt swamps behind the bight.

At nearly E.N.E. 4 miles from cape Elizabeth is a sand-hill 100 feet high, and is one of the most elevated hills bordering upon Tipara bay. This, like those farther to the northward, is covered with bushes, except on its side, where a considerable bare space distinguishes it from the other hills. This sand-hill, when seen from off the northern extreme of the bay, appears as a point.

From Sand-hill point, which has a rocky ledge projecting from it a quarter of a mile to low-water mark, a sandy beach trends N.N.E. 2 miles to Middle point, and is backed by sand-hills 50 to 60 feet high, covered with bush. From nearly 1 mile off Sand-hill point the 3-fathoms edge

of the shoal water fronting the shore gradually closes the land to about $1\frac{1}{2}$ cables' lengths off Middle point.

Middle point is a rocky projection, with a smooth grassy summit, and may be more closely approached by large vessels than any other part of the shore in Tipara bay, there being anchorage in 4 fathoms, ooze, at about 3 cables lengths westward of the beach.

The eastern shore of Tipara bay, after receding a quarter of a mile eastward from Middle point, trends N.N.E. 2 miles, and mostly consists of sandy cliffs of a light reddish colour, with rocky points and ledges of rocks projecting to low-water mark, 1 to 2 cables' lengths from the shore. At $1\frac{1}{2}$ miles northward of Middle point the land rises from the shore to a hill 105 feet high; the land to the north-eastward of the point being smooth and grassy.

From three quarters of a mile N.N.E. of this hill the coast curves round north-westward 3 miles to a low point, and forms a fine sandy bay, with a sand-flat that dries nearly half a mile out at low water, and the 3-fathoms edge of the shoal water fronting it, extending one-third of a mile to 1 mile from the shore.

LONG POINT.—From the northern extreme of the sandy bay just noticed, a low mangrove shore, with rocky ledges projecting half a mile to the southward, extends $1\frac{1}{2}$ miles westward to Long point, the northern extreme of Tipara bay; the extremity of this point is rocky, and about 20 feet high, with a mangrove shore on either side.

Even small coasters should give Long point a good berth, on account of the dangerous Walrus covered rock, N.N.W. $\frac{1}{2}$ W. nearly 1 mile from the point, and the very shoal water which extends southward and westward from it.

LONG POINT BUOY.—A red nun-buoy lies in 3 fathoms, at the west extreme of the shoal water extending from Long point, with cape Elizabeth bearing S. $\frac{1}{2}$ E. and Long point E. by N. $\frac{1}{2}$ N.

The 3-fathoms edge of the shoal water stretching out from Long point extends from $1\frac{3}{4}$ southward of the point to Long Point buoy, and then sweeps round in a N.E. direction towards Wallaroo bay. At about 6 miles from the land there are 6 fathoms, and where the depth of water is less than 6 fathoms the bottom is generally sand, covered with grass or weed; but West and S.W. of Long point, where the soundings exceed 6 fathoms, the bottom is generally coral.

Between the shoal water extending from Long point and the north-eastern shore of Tipara bay there are 4 fathoms at about $1\frac{1}{4}$ miles from Long point and from the beach to the eastward.

From 2 miles southward of Long point to about the same distance north-eastward of cape Elizabeth, a space of 4 miles, the depth of water only varies from 6 to $5\frac{1}{2}$ fathoms, with 5 to 4 fathoms within 1 mile of any

part of the eastern shore, and 5 fathoms within half a mile of the Middle point of the bay, the bottom being sand and shells.

ANCHORAGE.—In south-westerly gales there is good anchorage in $4\frac{1}{2}$ fathoms, mud, in the southern part of Tipara bay, with the north-western point of cape Elizabeth bearing S.W. by W., and the high sand-hill E. $\frac{1}{2}$ N.

The **MOONTA MINES** lie East 3 miles from the Middle point of Tipara bay, but the buildings and miners' houses cannot be seen from seaward, except from a westerly direction. This part of the country has a very pleasing aspect, it being formed of ridges trending straight in from the sea, and the land being covered with long grass, having clumps of scrub here and there, with undulations of moderate steepness.

TIPARA REEF, which lies directly in front of Tipara bay, is an extensive bank of sand, of an equilateral shape, its three sides being each nearly $1\frac{3}{4}$ miles long, extending N.N.W. and N.E. $\frac{1}{2}$ E. from the south extreme, and E.S.E. from the north, to the east extreme of the reef. There is a rocky patch awash at low water, springs, on the south-western part of the bank, at one-third of a mile from its south extreme; it is about 1 cable long, North and South, and 20 yards wide, and lies N.W. $\frac{1}{2}$ N. nearly $5\frac{1}{4}$ miles from cape Elizabeth. The depth of water upon the remaining portion of Tipara reef varies from 3 fathoms, at the edges, to $1\frac{1}{2}$ feet near the centre (where the plan shows a beacon, with a *white* flag, at N. by E. $\frac{1}{2}$ E. half a mile from the light-vessel), and there are 3 feet at half a mile within the north extreme. From the northern extremity of Tipara reef Long Point buoy bears N.E. by E. $\frac{3}{4}$ E., distant $3\frac{1}{4}$ miles.

LIGHT-VESSEL.—A temporary light-vessel has been substituted for the floating beacon, which has hitherto been moored on Tipara reef. The vessel exhibits two lights; a *fixed white* light from the main-mast, at an elevation of 24 feet above the level of the sea, and visible in clear weather, from a distance of 7 miles; and a *fixed red* light from the foremast, at 12 feet above the sea, said to be seen westward of the magnetic meridian at a distance of 3 miles.

The vessel is painted *red*, carries a *red* ball at the main mast-head, and lies close to the rocky patch, near the southern extremity of the reef, with cape Elizabeth bearing S.E. $\frac{3}{4}$ S., and Long point N.E. by E.

In approaching the light from the N.N.W., a vessel should not stand towards the northern extremity of the reef whilst the *red* light is visible, nor in hazy weather, into less than 7 fathoms.

Unless it is blowing very strong, there is only a small break on the rocky patch, and none whatever on any other part of Tipara reef; but some of the shallow parts show white, where the sand is clear of weeds.

At 4 miles westward of Tipara reef there are 10 fathoms, coral, and on the north-west side the soundings decrease very regularly towards it, but on the south and south-west sides there is a sudden shoaling from 5 fathoms to the edge of the reef.

TIDES.—The flood stream sets N.N.E. and the ebb S.S.W. 2 knots over Tipara reef; outside it the stream sets more North and South.

Between Tipara reef and Tipara bay a broad sandy bank, with $3\frac{1}{4}$ to 5 fathoms on it, extends from the western part of the shoal water stretching out from Long point to the rocky patches northward of cape Elizabeth. From the shoalest part yet discovered on this bank the Middle point of Tipara bay bears nearly E. by S. $\frac{1}{2}$ S. and cape Elizabeth S. $\frac{1}{2}$ W.

WALRUS ROCK, N.N.W. $\frac{1}{2}$ W. nearly 1 mile from Long point, is a dangerous patch 2 cables long, N.E. and S.W., and 1 cable broad. Although there is not more than 1 foot at low water, springs, on some parts of this patch, the sea does not break upon it in ordinary weather, as the shallow water outside it prevents any sea from rolling in. There are, however, strong tide ripples over the rock; notwithstanding which small coasters have struck on it. There are only 9 feet water between Walrus rock and the shore.

CLEARING MARKS.—Commander Hutchison erected a pile of stones on the north-east part of Bird reef, at N.N.E. $\frac{1}{2}$ E. $2\frac{1}{4}$ miles from Long point, which, if still remaining, would be a good mark for clearing Walrus rock, by keeping the pile in line with, or open eastward of the smelting chimney at Wallaroo, the latter bearing N.E. by E., which will lead half a mile outside Walrus rock, in 2 fathoms water.

The coast from Long point takes a general N.E. direction $6\frac{1}{4}$ miles to Hughes point, the southern extreme of Wallaroo bay, and consists of a low sandy beach, in some places fringed with mangroves, and having rocky ledges projecting half a mile to 2 cables' lengths upon sand-flats, which front the shore, and at low water, springs, dry out $1\frac{1}{3}$ miles to Bird reef. Between Long point and Bird reef the flat dries out above three-quarters of a mile, and north-eastward from the reef, the outer edge of the flat closes the shore to about $1\frac{1}{2}$ cables' lengths off Hughes point.

BIRD REEF, which lies nearly N. by E. $\frac{3}{4}$ E. $2\frac{1}{4}$ miles from Long point, and $1\frac{1}{4}$ miles from the shore, is a hard rocky ledge about a quarter of a mile long, N.E. and S.W., and 1 cable broad; it is awash at high water, springs, but at other times is generally covered with birds. There are 2 fathoms water at 2 cables' lengths westward of Bird reef. To clear this danger Long Point buoy should not be brought to the westward of S.W.

BIRD ISLES, which are low and covered with mangroves, are situated

in line, N.W. by W. $\frac{1}{2}$ W. and S.E. by E. $\frac{1}{2}$ E., on the sand-flat between Bird reef and the shore. The outer isle is half a mile, and the other 1 cable long, both being less than 1 cable broad.

From $2\frac{1}{2}$ miles north-westward of Long point the 3-fathoms edge of the shoal water which fronts this part of the coast trends N.E. by E. $\frac{1}{2}$ E. nearly 4 miles to a narrow spit, with $2\frac{3}{4}$ to 3 fathoms on it, extending nearly $1\frac{1}{2}$ miles to the north-eastward, and nearly 2 miles off shore. From the hight within this spit the 3-fathoms edge of the shoal water closes the shore to about a quarter of a mile off Hughes point. There are three 3-fathoms patches between the spit and Wallaroo bay, lying, respectively, West 1 mile, W. by N. three-quarters of a mile, and W.N.W. $1\frac{3}{4}$ miles from Hughes point.

HUGHES POINT, the southern extreme of Wallaroo bay, cannot be distinguished by vessels entering the bay until close into the anchorage. From the westward this point appears as a small red patch on the coast, it being only a red cliff about 25 feet high ; but at one-third of a mile south-westward of the point there is a hill 25 feet high, close to the shore. From Hughes point the southern shore of Wallaroo bay trends N.E. by E. $\frac{1}{2}$ E. 1 mile to Wallaroo jetty, and may be approached to a quarter of a mile in $3\frac{1}{2}$ to 4 fathoms.

WALLAROO BAY is situated about half-way up the east side of Spencer gulf, and was in 1862, the only shipping port for the copper ore raised from the adjacent mines on Yorke peninsula. This bay extends from Hughes point N. $\frac{1}{2}$ W. $3\frac{1}{2}$ miles to point Riley, and is about $1\frac{1}{2}$ miles deep. There are regular soundings in 4 to $5\frac{1}{2}$ fathoms across the bay, from half a mile northward of Hughes point to about 1 mile southward of point Riley, and from that line to within half a mile of the shore there are $5\frac{1}{2}$ to 4 fathoms, over an even bottom of sand and weed.

THE BAR.—At about 5 miles off shore, abreast of Wallaroo bay, there are soundings in 10 and 11 fathoms, sand and shells, from whence the depth of water rapidly decreases to $4\frac{1}{2}$ and 4 fathoms on a sort of broad flat 4-fathoms bar stretching across outside the entrance of the bay, within which, as just stated, there are $5\frac{1}{2}$ fathoms.

As the depth of water on the southern part of this bar decreases to 3 and $2\frac{3}{4}$ fathoms on the spit to the S.W. of Wallaroo bay, the anchorage, though apparently open and exposed, is only so with winds from N.W. by N. round to West, which winds rise the most sea ; and even from N.W. the 4-fathoms part of the bar breaks much of the sea, which cannot be very great, as the western coast of Spencer gulf is only distant about 30 miles. The spit to the W.S.W. protects the anchorage from winds in that quarter.

REPORTED DANGERS.—Numerous dangers have from time to time, been reported to lie between the bearings of W.S.W. and W.N.W. from Wallaroo jetty ; but except those already noticed, Commander Hutchison could find none. He therefore attributes these reports to the shoal appearance of the water when running in from 10 and 11 to 4 and $3\frac{1}{2}$ fathoms, when the bottom becomes distinctly visible ; the weeds growing at the bottom appearing in the sun quite brown, like rocks, with white sand between them. But the lead brought up nothing but sand from an apparently even bottom ; no breakers being ever seen or reported.

The only case in which a vessel has struck, it is confidently believed, was on Riley shoal, when only a bearing of point Riley was taken.

ANCHORAGE.—There is good anchorage in Wallaroo bay, in 4 fathoms, with the jetty end bearing E.S.E. distant 2 cables' lengths. Small vessels can anchor in 3 fathoms, with the end of the jetty bearing S.S.E. to South, or may find good berths in 14 to 8 feet water alongside the jetty.

Vessels alongside the jetty have their anchors laid out well to the N.N.W., with a long scope of chain ; and in casting off swing clear when the wind is from N.W. to W.S.W., the only winds which throw any sea into Wallaroo bay. The *Beatrice* rode out a W.N.W. gale at single anchor, with 30 fathoms of chain,

WALLAROO.—From Hughes point the southern shore of Wallaroo bay although somewhat rocky, may, as before stated, be approached within a quarter of a mile in $3\frac{1}{2}$ to 4 fathoms, and there are $2\frac{1}{2}$ fathoms close to the jetty, immediately behind which is situated the township of Wallaroo.

JETTY AND TRAMWAY.—The jetty, which is constructed of wood, extends about 600 feet into 15 feet water at low water, springs. There is a double line of rails along the jetty in connexion with a tramway, communicating with the inland town of Kadina and the Wallaroo copper mines.

THE CUSTOM-HOUSE is a one-storied stone building near the shore, at about 150 yards eastward of the jetty. It is also the court-house and residence of the sub-collector of customs, who, as at Port Augusta, is also harbour master, shipping master, &c.

SMELTING WORKS AND CHIMNEY.—There is a large smelting establishment for copper ore close to the water's edge, at about 300 to 400 yards to the eastward of the custom-house. The chimney, which is square and built of light-coloured bricks, rises from about the centre of the works to the height of 140 feet above high-water level. As it is much higher than any of the adjacent land, it appears from seaward very distinctly against the sky, and can be seen over Long point.

During frequent northerly winds the chimney is so apparently raised by mirage that it can be discerned 20 miles off, and has been distinctly seen

from a boat off cape Elizabeth, a distance of 15 miles. In a calm morning the smoke may be seen at a much greater distance.

The smelting furnaces are arranged in a long line facing the N.W., and from seaward have some resemblance to a heavy battery with more than 30 embrasures, so that the light from the furnaces would be seen from a vessel within 6 miles north-westward of Wallaroo, as one or two doors are nearly always open, showing a brilliant light near the water's edge.

The township of Wallaroo, which is situated behind the jetty and smelting works, is elevated 50 or 60 feet above the beach: the houses are mostly constructed of wood, and quite temporary, though several substantial stone and brick buildings have been erected, and others are in progress.

The rise of Wallaroo has been rapid, as in 1860 there was only one house in the bay, the present town-site having been part of a sheep run. The population in 1862 was estimated at 5,000, but numbers are continually shifting.

WELLS.—At N.N.E. half a mile from the smelting works chimney is a bare sand-hill, at the foot of which, on the beach, are some wells of brackish water, where most of the live stock of Wallaroo are watered.

From the wells a fine sandy beach extends N. by W. $\frac{1}{4}$ W. $1\frac{1}{2}$ miles, and is bordered by a sand-flat, which dries off about 2 cables' lengths at low water, and has some rocky ledges on it to the northward. From the northern extreme of this beach a rugged rocky coast trends N.W. $1\frac{1}{2}$ miles to point Riley. The shore between the wells and the point may be approached within half a mile in $3\frac{1}{4}$ fathoms.

POINT RILEY, the northern point of Wallaroo bay, is a cliffy projection in lat. $33^{\circ} 52' 49''$ S., long. $137^{\circ} 37' 54''$ E., but is not easily distinguished until well in to the southward or northward of it, the back land being very much more elevated than the point, which is only 45 feet high. A ledge of rocks projects about a quarter of a mile westward and south-westward from the point; and the soundings for more than half a mile off it are irregular, and the bottom is rocky.

RILEY SHOAL, the west extreme of which lies S.W. by W. $\frac{1}{4}$ W. $1\frac{1}{4}$ miles from point Riley, and N.W. $\frac{1}{2}$ W. $3\frac{1}{4}$ miles from the smelting chimney, is a bank of hard sand, with 9 feet on its shoalest part, at low water springs. This bank is about 4 cables long, East and West, and $1\frac{1}{2}$ cables broad, with its shoalest part showing white, from the tide streams having washed away the weed, which seems to thickly cover the sandy bottom in other parts of Wallaroo bay. The northern edge of this shoal is marked by a buoy.

Two 3-fathoms rocky patches, with $3\frac{1}{2}$ to $4\frac{1}{2}$ fathoms about them, lie nearly midway between Riley shoal and the south side of point Riley; and a

rocky shoal, having $2\frac{3}{4}$ fathoms on it, with a 3-fathoms patch at 2 cables' lengths to the south-westward of it, lies N.W. by W. $\frac{1}{2}$ W. nearly 1 mile from the point. For a radius of about 1 mile from Riley shoal the soundings are irregular, varying from 5 and $4\frac{1}{2}$ fathoms, to the westward, to 5 and $3\frac{1}{2}$ fathoms to the southward and south-eastward of the shoal.

Supplies.—Fresh meat, both of beef and mutton, may be procured at Wallaroo; also abundance of firewood, but no vegetables nor fruit whatever.

Water.—As the wells are brackish, and the rainfall is small and mostly confined to the winter months, from November to April, water is very scarce at Wallaroo, there being no river nor standing water of any kind in the vicinity: the inhabitants have, therefore, to depend on distilled water during the whole of summer, and although there are several large stills at Wallaroo and at the mines, water was so scarce in November 1862, that it was selling at 8s. per hogshead. Vessels, therefore, likely to remain at Wallaroo for any length of time, should be well provided with water, or fitted, as some of the regular traders are, with a distilling apparatus on board.

DIRECTIONS.—The land between cape Elizabeth and point Riley presents no prominent feature to a vessel running up for Wallaroo bay; and at 10 or 12 miles off the land, the outline appears nearly straight and of a uniform dark colour, from the thick scrub that clothes the back land. The objects on the coast are low, and not seen distinctly until close in. During the frequent northerly winds, the mirage is so great that everything appears distorted, and the aspect of the coast entirely different to what it is on ordinary occasions.

For TIPARA BAY.—A vessel from the southward bound for Tipara bay, should approach cape Elizabeth so as to pass about $1\frac{1}{2}$ or 2 miles to the westward of it, to avoid the rocky patch which extends nearly a mile north-westward from the cape; and then steer North till the high sand-hill on the south-east side of the bay bears East, when an E.N.E. course leads right up to Middle point, off which there is anchorage in 4 or 5 fathoms, at half a mile from the shore. Middle point may be easily known by the coast to the southward being all sand-hills and bush, whilst Middle point and the land to the northward is smooth and grassy.

Southern Passage.—Tipara bay may be entered to the southward, between cape Elizabeth and the rocky shoals to the northward of it, by rounding the cape at the distance of about a mile, and having closely passed the buoy and brought the high sand-hill on the southern part of the eastern shore to bear E. by N. steer for it. This course will lead in 6 to 4 fathoms, about 2 cables' lengths northward of the shoal water extending from cape Elizabeth, and the same distance from the rocky patch to the northward.

From the Westward.—Vessels rounding the south extreme of Tipara reef should not bring cape Elizabeth to bear to the southward of S.E. $\frac{1}{2}$ E. ; whilst those intending to enter, or pass out of Tipara bay to the northward of this danger, should not bring Long point buoy to bear northward of E. by N. $\frac{1}{2}$ N. Long point, if visible, kept in line with the buoy, bearing E. by N. $\frac{1}{2}$ N., will lead half a mile northward of Tipara reef, in about 5 fathoms.

For WALLAROO BAY.—In running up for Wallaroo bay from the southward, during the day time, it would be advisable in a large vessel, to shape a course to pass 8 miles westward of cape Elizabeth. If that cape be distinguished, steer North or N. by W. until Wallaroo smelting chimney be seen, taking care not to approach Tipara reef in less than 6 fathoms, nor to go within 1 mile of the light-vessel.

When the smelting chimney bears E.N.E. a N.E. course may be steered, as the north point of Tipara reef will be well to the southward. When the chimney bears East a vessel may haul right in for it ; but if she is of heavy draught, run in with the chimney bearing E. by S. or E.S.E. The former course passes over $3\frac{1}{2}$ fathoms, and the latter 4 fathoms.

On getting within a mile or two of the anchorage, vessels are boarded by the harbour pilot and anchored in a convenient place to discharge or land cargo, by lighter ; or if under 15 feet draught, to haul alongside the jetty. If the harbour master or pilot cannot go off, the best anchorage is in 4 fathoms, sand, with the smelting chimney bearing E. by S. to E.S.E., and Hughes point S.W.

Should a vessel run too far to leeward, and have to work back into Wallaroo bay against a south-east or south wind, or work out against a north-west wind, tack off shore when the chimney bears S.E. by E., if point Riley is to the eastward of N.E., to avoid Riley shoal. When to the southward of that danger, the chimney may be brought as far southward as S.E. by S.

If, since the establishment of the Tipara reef light-vessel and the Long point buoy, a passage nearer the land be preferred by vessels proceeding from the southward to Wallaroo bay, they should not approach the light-vessel from the westward in less than 6 fathoms, nor go within a mile of her. From about 1 mile westward of the light-vessel steer a N.N.W. course in 6 to 5 and 7 fathoms, till Long point buoy bears East ; when steer N.E., taking care as Long Point buoy is brought to bear S.E. not to go into less than $4\frac{1}{2}$ fathoms. When Long point bears South an E. N. E. course may be shaped, and the pilot and harbour master will board the vessel and conduct her to the anchorage or jetty.

Working up.—Large vessels working up for Wallaroo bay from the southward should keep outside Tipara reef, not shoaling to less than

6 fathoms nor approaching the light-vessel within a mile, or not bringing cape Elizabeth to bear southward of S.E. till the smelting chimney bears N.E. by E. $\frac{1}{2}$ E., when the vessel may stand into $4\frac{1}{2}$ fathoms, taking care not to get into less water till the chimney bears East, as the water shoals quickly from 9 to 4 and 3 fathoms.

Inner Passage.—To pass eastward, or inside Tipara reef from the southward to Wallaroo bay, give cape Elizabeth a berth of $1\frac{1}{2}$ miles to avoid the rocky patch before mentioned, and when the cape bears S.E., distant $1\frac{1}{2}$ miles steer N. $\frac{1}{4}$ W., which will lead through the inner passage between Tipara reef and Tipara bay, in not less than 4 fathoms, passing three-quarters of a mile eastward of Tipara reef, and nearly the same distance westward of Long point buoy.

In beating through keep the lead going, and when standing in shore a vessel drawing more than 17 feet should not bring Long point buoy westward of W.N.W. ; and in standing off, when to the southward of the parallel of the north extreme of Tipara reef, the eastern extreme of the reef will be avoided by not bringing Long point buoy to bear eastward of N.N.E.

Small vessels may pass inside Long Point buoy, taking care not to bring cape Elizabeth to bear westward of S. $\frac{3}{4}$ W., so as to avoid Walrus rock, which with the above bearing of the cape, will be passed in 2 fathoms at the distance of half a mile.

At Night no vessel in the vicinity of Tipara reef should go into less than 7 fathoms, nor attempt to enter Wallaroo bay until the lights from the smelting works are clearly defined, bearing E. $\frac{1}{2}$ N., when that course may be shaped for the anchorage, taking care to avoid the spit at 2 miles westward of Hughes point, and not to go into less than 6 fathoms, unless the pilot has taken charge, or the commander of the vessel is sufficiently well acquainted with the bay to take her in.

PILOTAGE for entering or leaving Wallaroo bay, by a vessel of less than 12 feet draught, shall not exceed 2*l.* ; and for every foot or part of a foot more than 12 feet, 5*s.* It is compulsory for a vessel to take a pilot, if the master is not exempt.

TIDES.—It is high water in Wallaroo and Tipara bays, full and change, at 5 h. 45 m., and ordinary springs rise 4 feet 8 inches, but both the time of high water and the rise and fall seem subject to the wind. When there is no disturbing cause the ebb and flow are regular at the time of springs, and for two or three days before and after ; but at neaps there are great irregularities, the tide sometimes remaining nearly stationary for 24 hours, and with one ebb and flow during that period, at which time the stream along the coast becomes very weak and irregular.

Light easterly and northerly winds bring the lowest tides and south-

westerly gales the highest; in the latter case high water generally remains stationary till the wind begins to lull. In summer the tide generally falls about a foot lower than in winter, and they are more regular. A westerly gale seems to have the same effect on the stream that it has on the rise and fall, causing a long flood stream, and stopping the ebb altogether.

The ordinary methods of finding the time of high water are impracticable at Wallaroo, as it is frequently high water at about the same time every day for a week. As a general rule it is high water at daylight, and low water at noon, or an hour before.

Tide Streams.—At the anchorage in Wallaroo bay the stream is barely felt; but when the wind is blowing strong into the bay, there is a sensible set to windward. Outside the line from point Hughes to point Riley, the flood sets to the N.E., and the ebb to the S.W., about 1 knot.

Outside Tipara reef the streams set North and South, but within it the streams follow the line of coast.

In Tipara bay the flood sets round the coast to the northward, and the ebb to the southward. Off Middle point the streams set N.N.E. and S.S.W.; and along the south side of the bay they set East and West.

Off cape Elizabeth the tide streams are stronger than in Tipara bay, and set N.E. and S.W., about 2 knots. But as they are irregular and rapid in the vicinity of Tipara reef, cape Elizabeth, and Long point, the influence of the tide streams must be guarded against in these localities.

WINDS.—During the four months, from August to November 1862, no particular wind could be said to prevail, as it shifted round the compass every three or four days. After a day or two of calms, or land and sea breezes, the former from the East, and the latter from S.W., the wind veered round to the northward; at first light, with a clear sky, the barometer falling sometimes to 29·5 inches, and the land on the opposite side of the Spencer gulf becoming miraged into view.

If the wind shifted to N.W., and the sky became overcast, and the barometer showed no signs of rising, a gale was expected. On the barometer beginning to rise the wind shifted round to West and S.W., with a clear sky. When the wind in veering round gets to S.W. or West, and backs round to N.W. again, some heavy weather may be expected, which sometimes lasts two or three days.

The wind from the northward is very hot, even in winter, and the shift of wind to the westward sometimes comes in heavy squalls, accompanied by thunder and lightning, the blast being extremely hot. If the wind shifts from North right round to S.W., and does not back, and the barometer suddenly rises, the weather remains fine.

From November to March the prevailing winds are South and S.W., sometimes blowing for weeks together in Spencer gulf, with land and sea

breezes in shore, the south-west wind sometimes blowing very freshly, but occasionally interrupted by a day or two of hot wind from the North.

The Barometer is a very good guide, and rises rapidly as a gale shifts to the S.W., after which the wind soon subsides.

TICKERA BAY.—From point Riley a rocky coast and limestone cliffs trend N.N.E. $\frac{3}{4}$ E. $8\frac{1}{2}$ miles to Tickera bay, a slight indentation of the coast, with a smooth sandy shore, fronted by sand-flats, and extending from the end of the cliffs N.E. by N. 4 miles. At about the middle of the bay is a red cliff 44 feet high, with some huts to the southward of it.

ANCHORAGE.—Tickera bay affords anchorage in 3 fathoms, at about 1 mile off shore, sheltered from winds southward of S.W., with the huts bearing S. by E. This anchorage is partially protected by a 2 and 3-fathoms spit, which runs out north-westward from the shore.

From Tickera bay a smooth sandy beach extends N.E. by N. $4\frac{1}{2}$ miles to a small bight, and from thence continues in the same direction $5\frac{1}{2}$ miles to Webling point. The whole of this beach is fronted by a flat stretching out 1 to 2 miles, with $3\frac{1}{2}$ and 4 fathoms within about 2 miles of the shore, except off Webling point, where a $2\frac{1}{2}$ -fathoms spit runs out $3\frac{1}{2}$ miles north-westward from the shore, south-westward of the point.

The back land between point Riley and Webling point rises to between 100 and 200 feet high, at 2 or 3 miles in shore; it is nearly level, and covered with thick scrub. From a distance at sea the clear grassy space at Tickera looks like the face of a cliff.

POINT WEBLING is more elevated than any of the coast to the northward, and is thickly covered with green scrub and stunted pines: there is a bank of reddish earth 50 feet high, just to the northward of the point.

TIDES.—It is high water at Point Webling, full and change, at 6h. 10m.; springs rise 6 to 9 feet.

HAMILTON LAGOONS are two shallow inlets to the eastward and north-eastward of Webling point, surrounded by swampy land, except on their east sides, which are thickly wooded; the entrances are about 2 cables wide, with narrow boat-channels leading in through the sand-flats, which extend nearly 2 miles off shore.

Southern Lagoon.—From Webling point the low shore sweeps round north-eastward about 3 miles to the entrance of the southern lagoon, the channel leading into it having 6 or 8 feet at low water, and in some parts more than 2 fathoms; but the entrance cannot be distinguished until close in with the land, as it is embayed and hid by mangroves. From the entrance this lagoon runs in about $2\frac{1}{2}$ miles to the southward, and is $1\frac{1}{2}$ miles wide at its southern end; but at low water, springs, it is nearly dry.

Northern Lagoon.—The entrance of the northern lagoon lies $2\frac{3}{4}$ miles northward of that just described, and can be plainly distinguished from seaward, it having a red cliff on its north side, and a small mangrove islet at W.S.W. 1 mile from it; but the channel leading into it is entirely blocked up at low water, springs. This lagoon runs straight in from the entrance, nearly at right angles to the coast, and is about 2 miles in extent; but, like the southern lagoon, is nearly dry at low water, springs.

From the entrance of the northern Hamilton lagoon the coast trends N. by W. 8 miles and West $2\frac{1}{2}$ miles to Woods point, and forms a sandy beach, having low swampy land behind, and being fronted by a hard sand-flat, which dries 2 to 4 miles out.

WOODS POINT, nearly N. $\frac{1}{2}$ W. 12 miles from Webling point, is a low sandy projection, with a clump of trees a little in-shore; the sand-flat fronting it, dries out 3 miles at low water, springs, and a spit runs out from the flat W.N.W. 4 miles from the point.

POINT JARROLD.—The low sandy beach from Woods point sweeps round north-eastward 3 miles to a swampy bight, with clumps of wood behind it, extending $2\frac{1}{2}$ miles across from S.E. to N.W., from whence the low shore trends north-westward $4\frac{1}{2}$ miles to point Jarrold, which is low and sandy. This coast is in some parts broken where the water forces its way into the swamps behind. The sand and mud-flats which border the shore, and uncover at low water, springs, extend about $1\frac{1}{2}$ miles off point Jarrold.

From point Jarrold the mangrove shore trends N.N.E. $3\frac{1}{2}$ miles to the southern entrance point of Germein bay. The low land behind is partially flooded at high water, springs, and the sand and mud-flat which borders the shore dries out $1\frac{1}{2}$ miles at low water, springs.

The whole of the sand and mud-flats which extend along shore from Hamilton lagoons to the southern entrance point of Germein bay are fronted by shoal water of 2 to 3 fathoms, its average extent from the flats being about 2 miles, with a 3-fathoms spit extending 3 miles north-westward from point Jarrold.

BARN HILL.—From a hill seen from Spencer gulf, bearing E. $\frac{1}{4}$ N., distant 26 miles from point Riley, a hilly range takes a general N. $\frac{1}{2}$ W. direction nearly 30 miles to a hill, 612 feet high, bearing East, distant $11\frac{1}{2}$ miles from Woods point. Barn hill, E. $\frac{1}{2}$ N. 13 miles from Webling point, is a conspicuous object 1,169 feet high; and at 9 miles farther South, is another hill, which is 1,370 feet high. But these hills, like the Middle-back range on the west side of Spencer gulf, are too distant to be of much use to the navigator.

MIDDLE BANK, which lies nearly midway between Webling point and the opposite side of Spencer gulf, and has 3 to 5 fathoms water on it

extends N. $\frac{1}{2}$ E. and S. $\frac{1}{2}$ W., and is about 3 miles across. The shoalest part is a patch $1\frac{1}{2}$ miles long and half a mile broad, having 3 fathoms on it; it is situated near the north-eastern edge of the bank, with point Riley bearing S. $\frac{1}{2}$ E., distant 18 miles and Plank point N.W. by W. $\frac{1}{4}$ W. 15 miles. The southern extreme of Middle bank lies S. by W. 7 miles from the centre of its shoalest part.

SOUNDINGS.—From Tipara reef to Middle bank the soundings are mostly regular, over a sand and coral bottom. Between Middle bank and the shoal water extending from the western shore, southward of Plank point, the channel is $8\frac{1}{2}$ miles wide, with 6 to 15 fathoms, coral.

Between the southern part of Middle bank and the shoal water bordering the east coast about Tickera bay there is a space 5 miles wide, with 6 to 11 fathoms; but a shoal spit extends S.W. 15 miles from the sand-flat which fronts Woods point. The extremity of this spit, on which there are $4\frac{3}{4}$ fathoms, lies 7 miles off shore, and 3 miles eastward of Middle bank. There are $3\frac{1}{4}$ and $3\frac{3}{4}$ fathoms on the middle of the spit, with 4 to $4\frac{3}{4}$ fathoms towards its south-west extreme, and 4 to $3\frac{1}{2}$ fathoms towards the sand-flat of Woods point. A patch with $4\frac{3}{4}$ fathoms on it lies 2 miles southward of the south-west extreme of the spit.

There is a channel 2 miles wide, with 7 to 10 fathoms, coral, between Middle bank and the spit, and between the spit and the shoal water fronting the east coast there is a space 4 miles wide, with $5\frac{1}{4}$ to 8 fathoms; but there appears to be no certain passage out of it to the northward, except across the inner part of the spit, where there may be not more than $3\frac{1}{4}$ fathoms.

From Middle bank to a line between point Jarrold and mount Young, a distance of 22 miles, Spencer gulf appears free from any shoal, over a width of 15 miles, with 6 to 15 fathoms, sand and coral.

EASTERN SHOAL is a sand-bank 7 miles long, N.E. by N. and S.W. by S., and 1 mile broad, having a patch half a mile in extent on its north-east end, which dries at low water, and bears from point Lowly S. by E. $\frac{1}{4}$ E., and from Hummock hill E. by S., distant 11 miles. At $1\frac{1}{2}$ miles south-westward of the patch there are 9 feet water, the depth gradually increasing to 3 fathoms on the south-west end of the shoal. There is a clear channel 3 miles wide, with 6 to 10 fathoms, ooze and fine dark sand, between Eastern shoal and Fairway bank.

GERMEIN BAY.—From the mangrove point $3\frac{1}{2}$ miles N.N.E. of point Jarrold, the entrance of Germein bay extends North $9\frac{1}{2}$ miles to Ward spit, and is 10 miles deep; but it is mostly occupied by sand-banks and shoal water. This bay is only frequented by such coasting vessels as go to Port Pirie, in the south-east bight of the bay, to ship wool.

From the southern entrance point of Germein bay its south-eastern shore, which consists of thick mangroves, with partially flooded land behind, trends N.E. $\frac{1}{2}$ E. $9\frac{1}{2}$ miles to the south-western entrance point of Port Pirie. This shore is bordered by sand and mud flats, which dry out 1 mile at low water, springs, and is fronted by a shoal, with 3 to 12 feet water on it, extending 3 to $4\frac{1}{2}$ miles from the shore, and occupying nearly the southern half of the bay. At N.W. by N. $3\frac{1}{2}$ miles from the southern entrance point is a 3-foot patch, from which a spit extends $1\frac{1}{2}$ miles to the south-westward, forming between it and the shore a bight with 4 fathoms in it.

The outer edge of the shoal fronting the southern shore of Germein bay, after extending N.E. 4 miles from the spit just noticed, curves round eastward and north-eastward, forming a bight $4\frac{1}{2}$ miles broad and $1\frac{1}{2}$ miles deep, in the northern edge of the shoal; and then trends E. by S. 4 miles to within 2 miles of the south-western entrance point of Port Pirie. Between the north-western edge of this shoal and Eastern shoal is a channel $1\frac{1}{2}$ miles wide, with 6 to 12 fathoms, forming the southern entrance into Germein bay.

PORT PIRIE, in the south-east bight of Germein bay, is a creek resorted to by coasters in the wool season; its entrance may be recognized by mount Ferguson, on its north-east point, which bears N.E. $\frac{1}{2}$ N., distant $1\frac{1}{2}$ miles from the south-west point of the entrance. From mount Ferguson the mangrove shore curves round southward and forms a bight 2 miles across, the creek between the mount and the south-west entrance point being nearly 1 mile wide, with a depth of 15 feet in the centre; but the sand and mud-banks on either side close each other southward, leaving a channel not more than 50 feet wide, with 4 feet at low water, eastward of the south-west entrance point.

In the first mile southward from thence the water again deepens to 18 or 20 feet, South of which the channel becomes very narrow, with not more than 6 or 8 feet water; and just beyond, at 4 miles southward of mount Ferguson, where the creek winds eastward, it is dry right across at low water, springs.

WOOL SHEDS.—Here in the wool season, in about October, coasters come up and lie aground to ship wool from the three sheds on the south side of the creek, which belong to the squatters in the neighbourhood; but this place is only adapted to short vessels of light draught. The only house visible from Port Pirie is situated on the slope of Flinders range, bearing E.N.E., distant 6 miles. There is a good road from this house to within a mile of the sheds; but all the land about the port is flooded at spring tides.

TIDES.—It is high water in the entrance of Port Pirie, full and change, at 7h. 15m.; ordinary springs rise 8 or 9 feet, but heavy south-west gales cause a rise of 11 or 12 feet.

MOUNT FERGUSON, on the north-eastern entrance point of Port Pirie, is a round grassy hill, 130 feet high, and makes out well against the dark scrub which clothes the slopes of Flinders range near mount Bluff, which is 2,301 feet high, and bears E. $\frac{1}{2}$ N., distant 6 miles from mount Ferguson. Mount Ferguson is insulated at high water, the land about it being a mangrove swamp. A sand-flat runs out 2 miles north-westward from the mount, and then curves in to its south-west side.

From about three-quarters of a mile north-eastward of mount Ferguson the north-eastern shore of Germein bay forms a sandy beach curving north-westward about 6 miles to Wards point; it is bordered by a sand-flat extending about three-quarters of a mile from the beach, with $2\frac{1}{4}$ and 2 fathoms at 2 to $1\frac{1}{2}$ miles from the shore. The country behind this beach is thickly wooded with gum-scrub and pines, and is generally low for 2 or 3 miles inland, when it rises gradually to the foot of Flinders range, which is here not more than 6 or 7 miles distant.

WARDS POINT, which forms the east, as point Lowly does the west side of the estuary to Port Augusta, or the upper part of Spencer gulf, is a round mangrove point, with its south extreme bearing E. $\frac{1}{2}$ S., distant 9 miles from point Lowly.

WARDS SPIT, which forms the northern side of Germein bay, extends W. by S. 6 miles from Wards point, and is dry at low water, springs. Its average breadth is about $1\frac{1}{4}$ miles; but it is much less near the shore, where the water forces a passage over the spit at half tide. A shoal, with not more than 8 or 9 feet water on it, extends $1\frac{1}{2}$ miles south-westward from the extremity of Wards spit, and from thence continues along the south side of the spit to Wards point, with a breadth of about half a mile, and 6 to 12 feet water on it.

The northern edge of Wards spit is also bordered by a shoal, with 7 to 18 feet water on it, extending a quarter of a mile to half a mile from the edge of the spit, and forming a bight at about $1\frac{1}{2}$ miles north-westward of Wards point.

The northern entrance of Germein bay, between the north-east extreme of Eastern shoal and the shoal water projecting from the south-west extremity of Wards spit, is about 2 miles wide, with $4\frac{1}{2}$ fathoms; the depth within increasing to 8 or 9 fathoms. The deepest water in the bay is along the south side of Wards spit, at about 1 mile from it.

A sandy bank, uncovered at low water, springs, lies S.S.W. $\frac{1}{2}$ W. 3 miles from Wards point, and W.N.W. 5 miles from mount Ferguson. It is about

1½ miles long, E.N.E. and W.S.W., and half a mile broad, with a narrow shoal enclosing it, and extending more than a mile from its western end. To the southward of this bank the water in Germein bay is nearly all shallow, the depth rarely exceeding 2½ fathoms.

There is a shoal between the sandy bank and the north-eastern extreme of Eastern shoal, with as little as 7 feet water on it; it is about 2 miles long, E.N.E. and W.S.W., with 3½ to 5 fathoms about it. There are also two small 3-fathoms patches between the sandy bank and the eastern shore, one lying N.W. by W. 3 miles from mount Ferguson, and the other South 1½ miles from Wards point.

ANCHORAGE in 3 to 3½ fathoms, may be obtained in Germein bay to the southward of Wards point, with the north end of the long sandy beach bearing North to N.N.E., at about 1½ miles off shore.

DIRECTIONS for SPENCER GULF.—Large vessels bound for Spencer gulf from the westward, may pass between, but are advised to keep South of Neptune isles; after which Wedge isle may be passed on either side, taking care to clear the Foul ground south-eastward of it, and the other dangers near the Gambier group. From about midway between West cape and Wedge isle, a N. by E. ½ E. course for about 100 miles, will lead to nearly midway between Middle bank and the western shore, passing 7 miles westward of Webb rock and Tipara reef.

For TIPARA and WALLAROO BAYS.—If bound to Tipara or Wallaroo, steer only so far on this course as to arrive at about 8 miles westward of cape Elizabeth, and then proceed as directed at page 102.

In entering Spencer gulf from Investigator strait, large vessels should pass South of Althorp isles, and having rounded the south isle, it should not be brought southward of E. S. E. until the islets about Pandalowie bay open West of West cape, or until the cape bears N. by E., which will lead 1 mile outside of S.W. rock and Emmes reef, in 19 fathoms. Small vessels generally pass between the northernmost Althorpe isle and cape Spencer; or from midway between the south and east isles, a N.W. ½ W. course will lead three quarters of a mile North of Emmes reef, and 1 mile off the reefs of Reef head.

At Night, a vessel entering Spencer gulf should bring Cape Borda light to bear South before hauling northward into Spencer gulf, and then run up North, between Wedge isle and Yorke peninsula.

Tides.—The flood stream divides off cape Spencer, one branch setting along shore, E.N.E., and the other to the northward.

From about mid-channel, on the west side of Middle bank, to point Lowly, the fairway course up or down, is N.N.E. or S.S.W., in 6 to 12 fathoms, passing 7 miles off the western shore below Plank point; but vessels generally keep more over towards that shore; and when in the

vicinity of the Western shoal it will be cleared to the eastward, in 3 fathoms, by keeping Hummock hill to the westward of North. When in sight of point Lowly, mount Brown kept over the point, bearing N. by E. $\frac{1}{2}$ E., leads up the gulf in 10 and 8 fathoms between Eastern shoal and Fairway bank. A vessel leaving Wallaroo bay for Port Augusta may pass on either side of Middle bank, but the west side is to be preferred.

With a strong wind blowing up or down Spencer gulf, the water always gets much smoother at the edge of the banks, and in working either way the lead is the best guide for tacking.

Pilots, &c.—It has hitherto been the custom for vessels bound to Port Augusta to proceed first to Port Adelaide, and there pick up a pilot for Spencer gulf and Port Augusta. Outward-bound vessels frequently leave their pilots at Wedge isle, in the entrance of the gulf.

Tugs can be procured at Port Adelaide, to which a mail goes over land once a week. The steamer which trades to Port Augusta frequently tows vessels up or down, through the estuary, on her trips backwards and forwards.

For GERMEIN BAY.—Vessels entering Germein bay should keep the lead going and a good look-out ahead, as after a few days' fine weather, the water becomes clear and the shoals can be seen. But during and after bad weather, the mud and sand are disturbed from the bottom, and the deepest water is generally the most discoloured.

In entering Germein bay between Eastern shoal and Wards spit, the northernmost detached hill north-westward of False bay, kept just open of Black point bearing N.W. by W. $\frac{1}{4}$ W., will, in 5 fathoms water, clear to the southward the shoal water extending from Wards spit. When Bay hill (a low grassy hummock at N.N.W. 7 miles from point Lowly) is well open of the bluff just to the northward of point Lowly, with the point bearing N.W. by N., an E. by N. course may be steered, which will lead up the bay in the deepest water, between Wards spit and the sandy bank to the southward of it, to the anchorage southward of Wards point.

Due allowance must be made for the tide streams if the wind be light, as the flood sets N.E. and the ebb S.W. across the entrance, about $1\frac{1}{2}$ knots, at springs.

Going out.—In going out of Germein bay a W. by S. course, or a direct course for mount Young, on the western shore, will lead out into Spencer gulf.

For PORT PIRIE.—If bound into Port Pirie, bring the northernmost detached hill N.W. of False bay, before mentioned, on with Black point bearing N.W. by W. $\frac{1}{4}$ W., or Bay hill just open of the bluff land North of point Lowly, bearing N.N.W. $\frac{1}{4}$ W., which will clear to the eastward

the north-east extreme of Eastern shoal. Keep these marks on till mount Ferguson comes on with mount Bluff (the summit of the southern part of Flinders range) bearing E. $\frac{1}{2}$ N., and then steer in, with these latter marks on.

If drawing more than 8 feet, when the south-west entrance point of Port Pirie bears S.E., edge a little more to the northward till this point bears S.S.E., when haul up E.S.E.; or keep the settler's house on Flinders range a little on the port bow. This course leads up to a good anchorage, in 15 feet, with the wool-sheds just showing over the east side of the creek, and mount Ferguson N.E. by N.

Southern Entrance.—As there is a channel $1\frac{1}{2}$ miles wide, with 6 to 12 fathoms, between the Eastern shoal and the north-western edge of the shoals extending from the southern shore of Germein bay, there appears to be nothing to prevent its being taken advantage of by a vessel bound to Port Pirie from the southward. Having run up the gulf until Hummock hill is in line with the northernmost detached hill N.W. of False bay, before mentioned, bearing N.W. by N., the vessel might enter the channel at about 5 miles north-westward of point Jarrold, and then steer N.N.E. $\frac{3}{4}$ E. in mid-channel, until mount Ferguson is in line with mount Bluff, bearing E. $\frac{1}{2}$ N., when she might proceed as just directed, after having entered by the northern channel between the Eastern shoal and Wards spit.

NORTHERN PART OF SPENCER GULF, OR ESTUARY OF PORT AUGUSTA.

The only shipping port for the northern copper mines and pastoral districts of South Australia is Port Augusta, situated nearly at the head of the navigable part of Spencer gulf. This estuary extends from its entrance, between point Lowly and Wards point, nearly N. by W. 32 miles to Port Augusta, and from thence about 4 miles farther to the head of the gulf, gradually contracting from 8 miles in width, at the entrance, to a quarter of a mile above Port Augusta.*

Flinders range, on the east side of the estuary, has some remarkable peaks; mount Remarkable, N.E. $\frac{3}{4}$ E. 22 miles from point Lowly, being 3,130 feet, and mount Brown, N.N.W. $\frac{1}{2}$ W. 19 miles from mount Remarkable, being 3,174 feet high. Vessels running up for point Lowly from the S.W., have sometimes mistaken False bay for the entrance of the estuary, which does not show till close up to point Lowly; but mount Brown can almost always be seen, and when it bears N. by E. $\frac{1}{2}$ E. point Lowly is directly in line with it.

* See Plan of Port Augusta, No. 401; scale, $m = 1$ inch.

POINT LOWLY is a long low projection, with a high sandy beach on its southern side, and gradually rising land at about half a mile to the westward. A cairn of stones 9 feet high, with its base $15\frac{1}{2}$ feet above high water, has been erected on the point. Although point Lowly is steep-to, a large vessel should give it a berth of not less than half a mile, to avoid Point Lowly shoal, to the northward.

POINT LOWLY SHOAL, N.N.E. three-quarters of a mile from point Lowly, is a bank of hard sand and rock, 2 cables long, North and South, and one cable broad, the least depth on it being $2\frac{1}{4}$ fathoms.

BACKY BAY.—From point Lowly nearly a straight coast extends N.N.W. $5\frac{3}{4}$ miles to the head of the bay; it is formed of low whitish cliffs and stoney beaches, with mangroves after the first 3 miles. Between 1 and 4 miles from point Lowly the coast rises to a ridge of hills, attaining an elevation of 328 feet. From the head of the bay, behind which is a salt swamp, the northern shore trends E. $\frac{1}{2}$ S. 2 miles to Backy point. The coast from point Lowly to within one mile of the head of Backy bay may be approached to a quarter of a mile in 9 to $3\frac{1}{2}$ fathoms; but a hard sand-flat, covered at high water, extends half a mile from the head of the bay, with shoal water a quarter of a mile farther out.

BACKY and CRAG POINTS.—The former is a bold, black, rocky point, which may be approached to a cable's length in 8 fathoms. From Backy point a bold, broken, rocky coast trends N. by E. $\frac{1}{2}$ E. $1\frac{1}{4}$ miles to Crag point.

DOUGLAS POINT, N. $\frac{3}{4}$ E. $2\frac{1}{2}$ miles from Crag point is rocky, with a low black cliff, the intermediate coast forming two bays, with sand-flats which at low water, dry out to the line of points, and are fronted by shoal water, of which the 3-fathoms edge extends half a mile from the sand-flats.

The coast from Douglas point takes a general N. $\frac{1}{2}$ W. direction $6\frac{1}{4}$ miles to Two Hummock point, and from $2\frac{1}{2}$ miles northward of Douglas point to within half a mile of Two Hummock point it consists of thick mangroves, with low land behind, and is bordered nearly the whole distance by a hard sand-flat, covered at half-tide, extending from a quarter to half a mile from the shore. The sand-flat is fronted by a narrow border of shoal water from Douglas point to Two Hummock spit, nearly one mile south-eastward of the southern extreme of Two Hummock point.

DOUGLAS HILLS are detached grassy ranges rising behind the coast between Crag and Two Hummock points, some of them being separated by rocky ravines. One of these hills, nearly N.W. 2 miles from Douglas point, has a cairn of stones 645 feet above high water. About 2,500 sheep were depastured on these hills, the shepherd's stone hut and well being

situated two-thirds of a mile from the shore, at one mile northward of Douglas point. The well, which supplies about 240 gallons of very brackish water daily, is 120 feet deep, and is very conspicuous from having a heap of very white limestone round it, thrown up during the excavation.

DOUGLAS BANK, the centre of which lies N. by E. $2\frac{2}{3}$ miles from Douglas point, is about half a mile long, North and South and 1 cable broad, with a depth of only 10 feet on it at low water; the shallowest water being on the west side of the bank, from whence it deepens suddenly to 6 and 8 fathoms; whilst on the east side and off the southern end of the bank the water gradually deepens to 6 fathoms at half a mile off. There is a *checkered* nun-buoy on the south end of the bank, from which Douglas point bears S. by W., distant $2\frac{1}{2}$ miles.

There is a clear channel nearly three-quarters of a mile wide, with $5\frac{1}{2}$ to 10 fathoms, between Douglas bank and the west shore; and on the east side there is a clear channel 1 mile wide, with 8 to 4 fathoms.

CLEARING MARKS.—Mount Gullet, a wooded hill 209 feet high, on the east shore, N.E. by E. $\frac{1}{2}$ E. 6 miles from Douglas point bearing E. by N., clears the south end of Douglas bank, in 5 fathoms, and the same hill bearing E. $\frac{1}{2}$ S. clears the north end of the bank in 6 fathoms. Crag point in line with Douglas point, bearing S. $\frac{3}{4}$ W., just clears the west side of the bank in 7 fathoms; and Crag point in line with Backy point, bearing S. by W. $\frac{1}{2}$ W., or the north extreme of Two Hummock point in line with the north end of Bluff range, bearing N.N.W. $\frac{1}{4}$ W., clears it, passing half a mile to the eastward.

TWO HUMMOCK POINT is a low broad projection with alternate rock and sandy beach, having two hummocks covered with scrub; one on the point, and the other nearly three-quarters of a mile to the north-westward: the latter, which is the higher hill, is 94 feet above high water. There is a salt swamp extending from between these towards a third, or Inshore hummock, which bears W.S.W., distant $1\frac{1}{4}$ miles from South hummock.

A small knoll, with $3\frac{1}{2}$ fathoms on it, lies N.E. by E. $\frac{1}{2}$ E. two-thirds of a mile from the north extreme of Two Hummock point.

TWO HUMMOCK SPIT.—From Two Hummock point the sand-flat dries out nearly half a mile, beyond which Two Hummock spit, with 9 to 12 feet water on it, extends nearly 1 mile south-eastward from the south extreme of the point. The outer edge of the spit is marked by a *black* buoy.

The EASTERN COAST from Wards point trends N. by W. $\frac{1}{2}$ W. $9\frac{1}{2}$ miles to a small salt creek, at nearly half a mile south-eastward of which mount Mambray, a hill covered with thick scrub, rises to the height of 14561.

111 feet. For nearly the first 3 miles from Wards point there are thick mangroves, between which and the creek the coast consists of a low sandy beach, with a level country, covered with thick gum scrub, behind it.

From the salt creek the low coast extends nearly in a straight direction N. by W. $5\frac{1}{2}$ miles to a point of thick mangroves on the southern side of Yatala harbour. For about 1 mile northward of the creek there is thick scrub, from whence a salt swamp, intersected by several creeks, extends to the southern side of Yatala harbour.

MOUNT GULLET, N. $\frac{3}{4}$ W. 3 miles from mount Mambray, is broad at the base, with a round flattish top, 209 feet high, and thickly covered with scrub. This and mount Mambray are the only conspicuous objects near the coast between Wards point and Yatala harbour.

The coast from Wards point to Yatala harbour is bordered by a hard sand-flat, generally three-quarters of a mile to 1 broad, which is covered at high water, and fronted by shoal water extending from one-third to three-quarters of a mile from the edge of the flat. At W. $\frac{3}{4}$ N. $2\frac{3}{4}$ miles from mount Gullet the sand-flat stretches out to a spit, on the north side of which a deep narrow creek, barred at its entrance, trends about $1\frac{1}{2}$ miles north-eastward, into the flat. From the entrance of this creek the edge of the sand-flat curves in a N.W. $\frac{3}{4}$ N. direction $1\frac{3}{4}$ miles, and then trends nearly N. by E. $1\frac{1}{2}$ miles to a spit, forming the south side of the entrance of Yatala harbour. To the north-westward of the creek the shoal water which borders the sand-flat projects 1 mile south-westward, in the direction of Douglas bank; but between this projection and the entrance of the harbour the shoal water does not extend beyond a quarter of a mile from the edge of the sand-flat.

YATALA HARBOUR.—From the point of thick mangroves on the south side of the harbour the mangrove shore trends eastward half a mile to Dowcett creek, and from thence north-eastward 1 mile, and south-eastward about the same distance to the head of Yatala harbour, which trends S.E. 1 mile into a mangrove swamp, and is about two-thirds of a mile wide; but this bight is so filled by a flat of sand, mud, and weeds, as only to leave a narrow channel leading into it, and which is barred at the entrance.

From the north side of the entrance of this bight the coast, which is backed by thick scrub, trends N.W. by W. $1\frac{3}{4}$ miles to a small jetty and hut, at one-third of a mile northward of which is mount Granger, a round black-looking hill covered with bushes, which, from its rising to the height of 257 feet from low flat land, is a good mark for the entrance of Yatala harbour. The coast from the jetty turns north-westward round the foot of the mount to a small salt creek about 1 mile from the jetty. From the creek the coast extends W.N.W. $2\frac{3}{4}$ miles to Red Cliff point,

midway between which and the creek Red Cliff rises to the height of 60 feet, the land behind it being swampy.

The coast from mount Granger to Red Cliff point is fronted by a sand-flat, covered at high water, extending from two-thirds of a mile to 1 mile from the shore. At W. by S. $\frac{1}{2}$ S. 2 miles from the mount an Oyster bank, awash at low water, springs, projects half a mile to the southward, and forms the north side of the entrance to Yatala harbour. Shoal water extends from three-quarters of a mile southward of the Oyster bank to about two-thirds of a mile from the edge of the flat abreast of Red Cliff point.

The ANCHORAGE, or navigable portion, of Yatala harbour is now a mere basin of shallow water in the sand and mud-flats, which extend from half a mile to nearly 2 miles from the land, the nearest approach to the shore being to the south-westward of the jetty under mount Granger; and even here the sand and mud dry out more than half a mile, the tide seldom reaching to the end of the jetty.

The entrance, which is three-quarters of a mile wide, lies between the north extreme of the southern sand-flat and the Oyster bank before noticed. There are 4 to 3 fathoms water close to the south side of the entrance, between which and the Oyster bank the depth decreases from 9 to $1\frac{1}{2}$ feet. The basin within the entrance is about 2 square miles in extent, with 6 to 15 feet water, and having the before-mentioned narrow deep channel leading eastward through the mud-flat to the head of the harbour; but the channel as before stated, is barred at the entrance. By comparing the soundings taken in former surveys with those obtained in 1863, Yatala harbour appears to be fast filling up.

DIRECTIONS.—Small vessels entering Yatala harbour should bring the Inshore hummock in line with the south extreme of Double Hummock point, bearing W. $\frac{1}{2}$ S., till mount Granger bears N.E., and then steer for it. To get into a position off the jetty, a vessel must pass over a 6-foot bank, at about half a mile within the entrance. There is a strong tide-ripple off the entrance, with southerly winds.

MIDDLE BANK, the south-eastern end of which lies N.N.E. $\frac{1}{2}$ E. $1\frac{1}{2}$ miles from the north extreme of Two Hummock point, is a little more than three-quarters of a mile long, N.N.W. and S.S.E., with an average breadth of 1 cable, the least water on it being 7 feet. Each end of the bank is marked by a *checkered* buoy.

There is a clear channel nearly three-quarters of a mile wide on the west side; and one on the east side, half a mile wide, having 6 to 10 fathoms. The west and more direct channel is preferred.

CLEARING MARKS.—Inshore hummock open North of South hummock, bearing S.W. $\frac{3}{4}$ W., clears, in $4\frac{1}{2}$ fathoms, the south-east end of Middle bank at the distance of 1 cable's length; or the Mangrove point, $2\frac{3}{4}$ miles north-westward of Two Hummock point, in line with the north side of a deep ravine in Bluff range, bearing W.N.W., just clears the south-eastern end of the bank in $3\frac{1}{2}$ fathoms.

Mount Brown, in line with the extreme of the mangroves on the north side of Red Cliff point, bearing N.E. by N., clears in 4 fathoms, the north-western extreme of Middle bank at the distance of a cable's length. There are no clearing marks for the south-western side of the bank; but a passing vessel should not go into less than 8 fathoms.

WESTERN COAST.—From Two Hummock point the low mangrove shore trends N.W. 3 miles to Mangrove point, and is bordered by a hard sand-flat extending from one-third of a mile off Two Hummock point, nearly N.W. by N. 4 miles, to the southern entrance of Blanche harbour. This entrance, which is one quarter of a mile wide, with $4\frac{1}{2}$ to 8 fathoms water, is bounded to the northward by the south-east extreme of West sands; from which a spit, marked by a *black* beacon, projects a quarter of a mile to the eastward.

WEST SANDS, which uncover at low water, springs, form a bank $1\frac{1}{2}$ miles long, N.W. by N. and S.E. by S., and half a mile to one quarter of a mile broad. Its north-eastern side may be passed within a quarter of a mile in 4 to 7 fathoms.

BLANCHE HARBOUR.—From Mangrove point the low mangrove shore of Blanche harbour trends westward $1\frac{1}{4}$ miles, and then turns northward to the west side of the northern entrance, nearly three-quarters of a mile westward of the north-west extreme of West sands. There is an extensive salt swamp behind the southern shore of the harbour.

The shores are fronted by flats extending half a mile to a quarter of a mile from the mangroves, leaving a space of about $1\frac{1}{2}$ square miles, with 1 to $2\frac{1}{2}$ fathoms water. Blanche harbour has two entrances; the southern entrance, between the south-east extreme of West sands and the flat, extending 1 mile from Mangrove point, and the northern entrance, which has a channel carrying 6 to 4 fathoms nearly 1 mile in towards the harbour, between West sands and the main-land.

The coast from the northern entrance of Blanche harbour extends N. $\frac{1}{2}$ E. $4\frac{1}{2}$ miles to Commissariat point, and mostly consists of rough stony beach, fringed with mangroves and fronted by a sand-flat, which at low water dries out nearly a quarter of a mile from the shore. The land behind this coast rises to the Bluff range, which at $1\frac{1}{2}$ miles southward of Commissariat point is only 1 mile from the shore.

BLUFF RANGE.—The Bluff is the eastern and highest part of a long flat-topped range, rising near point Lowly and extending about N.N.W. 12 miles and then N. by E. nearly the same distance to the Bluff, on which a cairn of stones has been erected 948 feet above high water ; but it is not easily distinguished from the scattered bushes on the summit, which is a few hundred feet broad, with a gradual slope to the westward. From the Bluff the range extends N.N.W. $4\frac{1}{2}$ miles, when it turns to the westward, leaving a detached ridge at the angle, named the Sisters, which seen from the S.E., appears as two peaks, the south-eastern being 737 feet high.

COMMISSARIAT POINT, which lies N.E. $\frac{1}{2}$ N. $1\frac{3}{4}$ miles from the Bluff, is so slight a projection of the mangrove coast as only to be distinguished when well to the northward or southward of it. The sand dries out half a cable's length from the mangroves, and a 2-fathoms bank extends 2 cables' lengths beyond the sand-flat. A *black* beacon has been erected close off the point.

POINT PATERSON.—From Red Cliff point a margin of thick mangroves curves round N.E. by N. and N.N.W. $3\frac{1}{4}$ miles, and from thence a low shore, with swampy land behind it, trends N.W. $\frac{1}{2}$ W. about the same distance to point Paterson, which is low, with a sandy beach and a large clump of mangroves immediately to the northward of it. Sand and mud-flats, intersected by several navigable inlets, extend from this nearly across to the western shore, to which side the gulf channel is confined.

FLINDERS CHANNEL trends nearly N.W. $\frac{1}{2}$ N. $3\frac{3}{4}$ miles from Middle bank to the north-west end of West sands, and is $1\frac{1}{4}$ to little more than half a mile wide, with $4\frac{1}{2}$ to 9 fathoms water.

SAND and MUD FLATS.—At S.W. by W. and W.S.W. $1\frac{1}{2}$ miles from Red Cliff point there are two small 4 and $4\frac{1}{2}$ -foot patches, from which a narrow intricate channel, carrying $1\frac{1}{2}$ to $4\frac{1}{2}$ fathoms, penetrates above 2 miles north-eastward and northward into the sand and mud-flat, and terminates in a basin about half a mile in extent, with $1\frac{1}{2}$ to $2\frac{1}{2}$ fathoms water.

At three-quarters of a mile north-westward of this inlet is a small $4\frac{1}{2}$ -foot patch at the entrance of a narrow channel, carrying $2\frac{1}{2}$ to $4\frac{1}{2}$ fathoms, and leading nearly North 2 miles from Flinders channel into a sheet of water $2\frac{1}{2}$ miles long, N.W. and S.E., and $1\frac{1}{2}$ miles wide, with $1\frac{1}{2}$ to 5 fathoms water, its nearest approach to the shore being distant half a mile, at $1\frac{3}{4}$ miles south-eastward of point Paterson.

EAST SANDS.—From the narrow channel just noticed the south-west side of East sands extends N.W. $\frac{1}{2}$ N. $2\frac{3}{4}$ miles, and has a narrow border of shoal water, nowhere more than 2 cables broad, except within half a mile of the spit forming the north-west extreme of the sands, from whence the shoal extends about half a mile to the southward and a quarter of a mile to the

westward; the western edge being marked by a *red* beacon, bearing N. by W. $\frac{1}{2}$ W., distant nearly 2 miles from the *black* beacon on the south-east spit of West sands. From the north-west spit of East sands the shoal continues nearly a mile to the northward, and has a mass of banks on it, partly uncovered at springs.

Between 1 and $1\frac{1}{2}$ miles northward of the *red* beacon is a detached bank $1\frac{1}{2}$ cables broad, and uncovered at springs, having a narrow, but deep channel leading round each end from Bluff reach into the sheet of water before mentioned. From point Paterson the hard sand-flat which fronts the shore extends S.W. 2 miles to a spit forming the south side of the entrance of Port Paterson, which is nearly blocked up by a narrow bank, uncovered at springs, extending from $1\frac{1}{4}$ miles S.S.E. of Commissariat point to 1 mile westward of Point Paterson.

BLUFF REACH is a continuation of the gulf channel from Flinders channel to Commissariat point; it is bounded to the westward by the west coast, and to the eastward by the shoals extending from the north-west spit of East sands, the detached bank to the northward of them, by point Paterson spit, and the narrow detached bank in the entrance of Port Paterson. The reach averages only half a mile in width, but it carries 4 to 9 fathoms.

CURLEW POINT.—From Commissariat point the west coast extends N. by W. nearly 3 miles to a mass of thick mangroves, of which the south-eastern margin trends N.E. by N. 1 mile to Curlew point. This coast is bordered by a sand and mud-flat, covered at half-tide, nowhere extending beyond a quarter of a mile from the shore, except within 1 mile of Curlew point, where the flat extends half a mile from the mangroves. A *black* beacon has been erected on a projecting part of the flat at $1\frac{1}{2}$ miles northward of Commissariat point.

CURLEW ISLE is merely a patch of mangroves on the flat projecting eastward from Curlew point, from which it is separated by a narrow channel dry at low water, and has a sandy knoll at its north end, which only covers at high water, springs. The shoal extends one-third of a mile eastward from the centre of the island, and is marked at its outer edge by a *black* beacon.

PORT PATERSON.—The low shores of this port from point Paterson trend irregularly N.N.E. $2\frac{1}{4}$ miles and westward nearly the same distance to Snapper point, the west extreme of a mass of thick mangroves projecting 1 mile south-westward from the high-water beach. The gulf channel here narrows to barely three-quarters of a mile in width, from mangrove to mangrove, and assumes the appearance of a river between the dense mangrove flats on either side. The south-east shore of Port Paterson

is fringed with mangroves, and at 2 miles north-eastward of point Paterson is intersected by a creek branching into the swamp to the south-eastward.

The shores of Port Paterson are fronted by sand and mud-flats generally extending about half a mile from the land, and covered at half-tide. From Snapper point a sand-flat, covered at half-tide, extends $2\frac{3}{4}$ miles southward, to the entrance of Port Paterson, which lies S.E. two-thirds of a mile from Commissariat point. The western bend of this flat is marked by a *red* beacon, bearing S.S.W., distant three-quarters of a mile from Snapper point.

The anchorage, or navigable part of Port Paterson is a sheet of water three-quarters of a mile in extent, with $3\frac{1}{2}$ fathoms, mud, and has an inner basin half a mile in diameter, to the north-eastward, both being enclosed by the sand and mud-flats which mostly occupy the bight between point Paterson and Snapper point. The approach to the anchorage is by a channel 2 miles long, leading N.E. from the entrance, and is open to the gulf channel when the north end of the beach at point Paterson bears E. by N. At about two-thirds of a mile and $1\frac{1}{4}$ miles within the entrance the deep water is confined to a width of 1 cable, with a depth of not less than 4 fathoms.

The communication from the outer to the inner basin is by a narrow winding passage, about a quarter of a mile long. It has only $1\frac{1}{4}$ fathoms in the entrance at low water, springs, but within the channel the soundings in the inner basin increase to $2\frac{1}{2}$ fathoms.

DIRECTIONS.—There are no marks to lead up the entrance of Port Paterson, but the best time to enter is at low water, as the banks then show on either side ; and if they are covered the different tide streams fill the channels with eddies, which gives the appearance of the whole being blocked up.

REMARKS.—The objection to Port Paterson arises from the extent of the sand and mud-flats surrounding it on all sides, rendering communication with the shore difficult after half ebb ; besides which, the adjacent coast is a swamp, with the exception of the sandy beach to the northward of the inner basin, which is nearly half a mile from low-water mark. In 1862, only one vessel was known to have entered this port to discharge a cargo ; and as it is out of the main stream of tide, it may be filling up like Yatala harbour.

SNAPPER REACH.—The continuation of the gulf channel from Bluff reach to Curlew isle is only 2 cables wide, with 3 fathoms water off Commissariat point ; from thence Snapper reach trends N. by W. $\frac{1}{4}$ W. 2 miles, when the channel is again contracted from a quarter of a mile to $1\frac{1}{2}$ cables in width, with 4 fathoms water, between the *black* and *red* beacons south-westward of Snapper point. From between these beacons the reach takes

a general N.N.E. direction 2 miles, to abreast of Curlew isle. To the northward of Snapper point the channel shows at low water, springs, as the sands uncover, leaving a width of a quarter of a mile to less than 1 cable.

From Curlew point a margin of thick mangroves, forming the western shore, curves round westward and northward 2 miles to Browns point; and from half a mile eastward of Curlew isle the eastern shore, also consisting of mangroves, curves northward and westward $1\frac{1}{2}$ miles to Orchard point, and from thence nearly N.N.E. 1 mile to abreast of Browns point. Both shores are bordered by sand and mud-flats, and the land behind the mangroves is mostly overflowed at springs, the adjacent country at the back of these swamps not exceeding 70 or 80 feet in height. Nearly opposite Browns point there is a creek, on the north side of which a red bank covered with bushes, rises to the elevation of 77 feet.

The gulf channel from the *black* beacon off Curlew isle nearly follows the direction of the southern and western shores, and shows at low water, springs, when the sands are uncovered, leaving a passage a quarter of a mile to less than 1 cable wide; but there are some dangers which do not show at low water.

A bank, forming the south side of the narrows northward of Curlew point, extends 2 and 3 cables' lengths northward and westward from Curlew isle; it has very regular depths of 3 to 12 feet on it. Its northern edge, which extends 2 cables' lengths East and West, is marked by two *black* buoys.

Shoals and sand and mud-flats, having 1 to 2 fathoms between them, extend nearly half a mile from the northern shore, their southern edge being defined by four *red* beacons; the first standing on a 9-foot knoll, at E. by N. $\frac{1}{2}$ N. one-third of a mile from the north extreme of Curlew isle. The other three beacons, which stand respectively N.W. by W. $\frac{3}{4}$ W. 4 cables' lengths, and W. by N. $\frac{1}{2}$ N. two-thirds of a mile, and three-quarters of a mile from the first, mark the southern edge of a sand and mud-spit projecting southward and eastward nearly 1 mile from Orchard point. There is a sand-knoll close to the northward of the fourth beacon, which covers only at high water, springs. The second and third beacons show the north, and the two *black* buoys the south, side of the narrows, which are here only half a cable wide, but have $3\frac{1}{2}$ to 4 fathoms water.

At S. by W. $\frac{1}{2}$ W. 2 cables' lengths from Orchard point the western edge of the spit extending from the point is marked by a *red* beacon, at half a cable's length south-westward of which is a 7-foot patch of hard sand covered with weeds, denoted by a *checkered* buoy. The channel, which is on the west side of this patch, is little more than 1 cable wide, with $2\frac{1}{2}$ to $3\frac{1}{2}$ fathoms water.

From the beacon last noticed, the edge of the flat which borders Orchard point, trends N. $\frac{1}{2}$ E. one-third of a mile to another *red* beacon, at 1 cable's length, to the westward of which is a larger patch than that to the southward, having 4 to 11 feet water on it. This patch is distinguished by a *black* buoy to denote that the channel to be used passes on the east side of the shoal, between the buoy and the beacon, where the depth is 17 to 14 feet.

From these narrows the gulf channel takes a general N. by E. $\frac{1}{2}$ E. direction three-quarters of a mile to abreast of Browns point, with an average width of 1 cable, and depths of $2\frac{1}{4}$ to 5 fathoms. The eastern side is steep-to, except opposite Browns point, where a spit projects nearly 1 cable's length from the sand and mud-flat. On the west side, shoal water and the sand and mud-flat extend one-third of a mile from the mangroves, their outer edge being marked by four *black* beacons. The channel is about 1 cable wide, and carries $2\frac{1}{2}$ to 4 fathoms.

The main coast line from the southern extreme of the red bank opposite Browns point, trends N.W. $\frac{1}{2}$ N. $1\frac{3}{4}$ miles to a projecting point, on which stands the flag-staff of Augusta. A sand and mud-flat, partly covered with mangroves, extends 2 to 3 cables' lengths from the shore.

From the mangroves, which extend two-thirds of a cable's length from the flag-staff, the western edge of the sand and mud-flat fronting the shore, trends South one-third of a mile, and from thence a narrow bank, partly uncovered at half-tide, extends in a S.E. by S. direction three-quarters of a mile to a spit, on which stands a *red* beacon at N.N.E. 2 cables' lengths from the extremity of the mangroves of Browns point.

The western edge of this bank, which forms the east side of the gulf channel, is marked by four *red* beacons: the first at N.W. by W. 3 cables' lengths from that on the spit; the second N.W. 3 cables' lengths from the first, and the other two within $1\frac{1}{2}$ a cable's lengths of the flag-staff. Between the first and second of these beacons a shelf, with 7 to 11 feet water on it, projects nearly half a cable's length from the edge of the bank; and another shelf extends nearly as far from the edge of the bank between 2 and 4 cables' lengths southward of the flag-staff.

Between this bank and the flat which extends from the north-eastern shore there is an inlet 1 to $1\frac{1}{2}$ cables wide, extending three-quarters of a mile to the north-westward. In the entrance, which is on the east side of the spit-beacon, there are $3\frac{1}{2}$ fathoms water, from whence the depth gradually decreases towards the head of the inlet.

The western shore from the extremity of the mangroves of Browns point curves round in a north-west and northerly direction $2\frac{1}{2}$ miles to Camp point, and is lined with mangroves. Between the first $1\frac{3}{4}$ miles of this shore and the more elevated land behind there is a swamp

3 to 2 cables broad, overflowed at springs ; this swamp, for the next three-quarters of a mile, does not exceed 150 yards in breadth.

The sand and mud-flat which borders this shore is not more than half a cable broad, except at a *black* beacon, opposite the flag-staff, and between 2 and 4 cables' lengths southward of Camp point, where it extends 1 cable's length from the mangroves. From 1 cable's length northward of this beacon to Camp point the flat is fronted by a narrow shelf, having 3 to 10 feet water on it, and forms a rocky spit, which projects nearly to the opposite side of the channel, at about half a mile southward of Camp point.

The gulf channel from Browns point to Port Augusta is generally half a cable wide, carrying $2\frac{1}{2}$ to $3\frac{1}{2}$ fathoms; but off Browns point it is reduced to half that width by shoal water extending from the south side to within half a cable's length of the spit beacon ; and between 4 and 5 cables' lengths farther up it is contracted in like manner by the shelf which projects from the bank between the first and second beacons on the eastern side.

At S. by W. $\frac{3}{4}$ W. 4 cables' lengths from the flag-staff a 9-foot spit, marked by a *black* beacon, shoals out three-quarters of a cable's length from the west side, leaving a 2-fathoms channel less than one-third of a cable wide. And at S.W. $\frac{1}{4}$ S., 2 cables' lengths from the flag-staff, a 5-foot shelf, also marked by a *black* beacon, projects from the west side, leaving the channel half a cable wide. This shoal, on which the barque *Rangoon* grounded and sustained serious damage in 1861, is dangerous, from being composed of hard sand and stones.

AUGUSTA.—ANCHORAGE.—The port reach, or anchorage of Augusta, extends from abreast of the flag-staff N.E. $\frac{1}{2}$ N. nearly half a mile, and is 1 to $1\frac{1}{2}$ cables wide, with 5 to 2 fathoms water, having sufficient space for eight or ten large vessels to swing at moorings, in 18 to 20 feet water.

Moorings have been laid down between the bearings of N.W. and North from the flag-staff, for the use of vessels loading at Port Augusta. The south mooring, in 30 feet water, has one buoy ; the middle mooring, in 26 feet, has two buoys ; and the north mooring, in 22 feet water, has one buoy. To each buoy has been attached $12\frac{1}{2}$ fathoms of $2\frac{1}{4}$ -inch chain, secured respectively to screw moorings. These moorings afford accommodation for two vessels, moored head and stern.

Masters and other persons in charge of vessels are required, when using the moorings laid down at the out-ports in the province of South Australia, to observe the following directions :—In fine weather, when there is little sea, a line may be made fast to the large buoy ; but on no account must a vessel hang on to the buoy longer than is absolutely necessary to moor the

vessel to the bridle, the buoy chains not being intended to moor by, but simply to show the positions of the moorings, and to facilitate picking up the mooring bridles.

In the event of the weather being such as would render it improper to take hold of the large buoy, the vessel must let go an anchor clear of the direction of the mooring chain on the bottom. At those out-ports where harbour-masters are stationed, or where pilots take charge of vessels, the direction and position of the mooring anchors and chains will be duly pointed out, and instructions given to masters of vessels in mooring and unmooring.

Having brought the vessel near the mooring-buoy, a little black wooden buoy will be seen, riding by a small chain attached to the mooring bridle, lying on the bottom. Having hauled up the small chain and brought the large link, or shackle to the hawse, shackle on the vessel's cable. Should an anchor be down, lift it, and, if necessary, shackle on the second chain; unshackle the small buoy, and veer cable as requisite; observing that, as the bridles are in short lengths, a vessel should ride with as much range as the locality or state of the weather would require were she riding at her own anchors.

In unmooring the small buoy chain must be secured before slipping, and the large buoy used under the same conditions as expressed in the first part of these regulations.

It will be obvious to masters of vessels that no confidence can be placed in securing vessels to the large buoys, when it is remembered that the constant friction of that portion of the chain touching the bottom so wears the stoutest chains, that very few months' wear shakes out the studs, rendering the chains quite unfit to hold on by, in any weather likely to cause a strain on them.

As every precaution is taken by the Marine Board to keep the moorings in a perfect state of efficiency, masters and others in charge of vessels, will be held liable for all expenses in the event of the moorings being injured, in addition to penalties of not less than 5*l.*, nor exceeding 20*l.*

PILOTAGE from point Lowly to Port Augusta, or from Port Augusta to point Lowly, is 10*l.*; and for every foot or part of a foot more than 14 feet draught, 10*s.*

From abreast of Yatala harbour to Port Augusta, or from Port Augusta to abreast of Yatala harbour, 6*l.*; and for every foot or part of a foot more than 14 feet draught, 10*s.*

THE TOWNSHIP of Augusta is situated on the south-east side of the port, and from the flag-staff, which stands in front of the Collector of Customs' house, extends nearly a quarter of a mile to the north-eastward. In 1862, it only consisted of a few wooden houses and two substantial

stone and brick stores. From the tolerably steep bank in front of the township the mangroves have been cleared away, and wooden jetties have been run out to low-water mark. Off the end of one of these jetties the coasting steamer, which runs to and from Port Adelaide twice a month, lies aground at low water.

Supplies.—All kinds of dry goods can be obtained from the stores at Augusta, and fresh meat from Sterling, a township E.S.E. 4 miles from Augusta; but vegetables are not to be had, the surrounding country not being fit for cultivation.

Fresh water cannot be obtained, except by dray from Woolundunga, a distance of 18 miles; but the Government intends to lay down pipes between Woolundunga and Port Augusta, to supply the town and shipping. There are some wells at Sterling, but the water is very brackish. Fire-wood can be obtained in small quantities.

Fish may be caught in great quantities with hook and line, principally snapper. The best snapper ground is between Snapper and Curlew points and close off the north-west edge of the bank forming the narrows at Curlew point.

Exports, &c.—The trade of Port Augusta is chiefly in exports; vessels coming up in October and November for the year's clip of wool, and taking away a great quantity of copper ore. The trade is fast increasing, as may be seen from the value of the exports for the years 1859, 1860, and 1861 respectively being 69,266*l.*, 134,111*l.*, and 168,387*l.* The value of the imports direct from beyond the Colony was 6,551*l.* in 1861.

The residence of the Sub-collector of Customs on the point is also the shipping office, post-office, court-house, &c.; that officer being port master, post master, shipping master, and, in fact, the only Government officer. In March 1862, the number of inhabitants was only 63.

TIDES.—It is high water at Port Augusta, full and change, at 8h. 30m.; rise at ordinary springs, 12 feet.

STERLING, E.S.E. 4 miles from Augusta, is a township, containing in 1862, 70 inhabitants. Government was then constructing a road across the salt swamps between the two townships.

From Augusta the low eastern mangrove shore curves northward two-thirds of a mile to the powder magazine. The sand and mud-flat which borders the shore extends about half a cable's length from the mangroves, and has a narrow shelf of shoal water along it, which, abreast of the powder magazine, projects nearly across the channel.

The gulf channel from Camp point winds to the northward, and is navigable for about 3 miles above Port Augusta, through a narrow passage, which at about 1 mile north-westward of the point, passes close to the eastward of Flinders Red cliff, at 1 mile above which, in a N.N.E. direc-

tion, the channel is dry at low water ; but the gulf, here reduced to a mere salt swamp, flooded at springs, extends about 25 miles to the northward from Port Augusta.

ASPECT.—The land immediately behind Augusta rises to the height of 73 feet and Flinders Red cliff is 95 feet high ; the latter being apparently the greatest elevation in this vicinity, and most of the adjacent land being low, with bare mud-swamps, overflowed at springs.

FLINDERS RANGE, on the east side of the upper part of Spencer gulf, and noticed at page 113, appears to be almost a continuation of the high range—of which Barn hill, already mentioned, forms one of the summits—extending in a N. $\frac{1}{2}$ W. direction from the head of the gulf of St. Vincent.

From 10 miles south-eastward of mount Ferguson, in Germein bay, Flinders range extends N. by W. $\frac{1}{4}$ W., 48 miles to Devil's peak ; the most conspicuous of the intermediate heights being mount Bluff, 6 miles eastward of mount Ferguson ; mount Remarkable, North 18 miles from mount Bluff ; and mount Brown, N.N.W. $\frac{1}{2}$ W. 19 miles from mount Remarkable. The first is 2,301 feet, the two latter are respectively 3,130 and 3,174 feet, and Devil's peak is 2,288 feet high.

From mount Brown other peaked mountains of considerable elevation, extend nearly 23 miles northward along the ridge of the same barren rocky range, when it terminates at mount Arden, beyond which nothing was visible from the sea. The ridge of Flinders range is distant 8 to 12 miles from the eastern shore between Wards point and Port Augusta, the intermediate space being mostly low and swampy.

DIRECTIONS.—Beacons and buoys having been placed to show the channel to Port Augusta, masters of vessels bound up the gulf will keep the *black* beacons and buoys to port, and the *red* to starboard. The beacons are placed in depths varying from 2 to 10 feet at low water, and care should be taken in approaching them, as many of them are close to the steep banks. Middle banks are denoted by *checkered* buoys, which may be passed on either side. There is a *checkered* nun-buoy on Douglas bank, and there are small cask buoys from Two Hummock spit upwards.

From about half a mile eastward of point Lowly the best course will be N. $\frac{1}{2}$ E. for about 12 miles, according to the tide stream, passing in 10 and 11 fathoms at 2 cables' lengths eastward of point Lowly shoal. This course will lead about one mile off Backy point, two-thirds of a mile off the shoal water projecting from the shore to the southward of Douglas point, and half a mile eastward of Douglas bank. From 10 fathoms off point Lowly shoal there are irregular soundings, in 6 to 12 fathoms, to Backy point, between which and Douglas point there are 12 to 10 fathoms, and from thence the depth of water gradually decreases to 6 fathoms eastward of Douglas bank.

After passing Douglas point, Backy point should be kept in sight, or in line with Crag point, bearing S. by W. $\frac{1}{2}$ W., until the northern extreme of Bluff range comes on with the north extreme of Two Hummock point bearing N.N.W. $\frac{1}{4}$ W., and then steer N. by W. till the North Hummock of Two Hummock point bears West. The next course will be N.W. $\frac{3}{4}$ N., to pass about a quarter of a mile westward of Middle bank, and through Flinders channel, between East and West sands, taking care not to get into less than 7 fathoms in the vicinity of Middle bank. The East and West sands, which are nearly 1 mile apart, generally show.

If, when in 10 or 9 fathoms at half a mile off Douglas point, it be desirable to pass westward of Douglas bank, where there is the deepest water, and the tide streams are strongest, steer N. by W. for the South Hummock on Two Hummock point, taking care to keep Crag point shut in by Douglas point, while mount Gullet bears between E. by N. and E. $\frac{1}{2}$ S., and not going into less than 9 fathoms. When mount Gullet bears E. $\frac{1}{2}$ S. haul out N. by E. till Inshore Hummock comes on, with the south extreme of Two Hummock point, bearing W. $\frac{1}{2}$ S., and steer N.W., $\frac{3}{4}$ N., passing westward of Middle bank and through Flinders channel, as just directed.

When the *black* beacon off Commissariat point bears North, or Red cliff is nearly in line with the foot of mount Granger, bearing S.E. by E. $\frac{1}{2}$ E., and the mangroves on the western shore distant half a mile, alter course to N. $\frac{1}{4}$ E. to pass through Bluff reach, gradually closing the western shore as Commissariat point is approached, and which should be passed at the distance of a quarter of a mile, until Commissariat Point beacon bears S.W., or point Paterson bears E. $\frac{1}{2}$ S. Just before rounding Commissariat point the depth of water decreases to 3 fathoms.

From about a quarter of a mile eastward of Commissariat point steer N. by W. $\frac{1}{2}$ W. through the lower part of Snapper reach, leaving the *black* beacon on the port, and the *red* beacon on the starboard hand; and having cleared the spit projecting from the bank close to the northward of the *red* beacon, alter course to about N.N.E., keeping on the eastern side of the channel, and passing within 2 cables' lengths of Snapper point.

To the northward of Snapper point the gulf channel becomes so narrow and winding, that the enlarged plan of Port Augusta will be a better guide than written directions for proceeding from Snapper point to Port Augusta, which, since the channel has been marked by beacons and buoys, is easy with a leading wind, without which no square-rigged vessel should proceed beyond Commissariat point. The wind from S.S.W. round to E.S.E. is a leading wind through all the reaches in going up; and from N.N.E. to W.N.W. it is a leading wind in coming down.

ANCHORAGE.—There is anchorage in any part of the estuary of Port

Augusta southward of Douglas bank, the best being in 6 fathoms, near the east coast, as the strength of the tide streams prevails most in the deep water along the west coast.

An anchorage in Backy bay has been recommended, with point Lowly bearing S. $\frac{1}{2}$ E., distant 3 miles ; but in winter, when strong north and west winds are frequent, more shelter may be obtained in 6 fathoms, sand, near the head of the bay, with Backy point bearing from N.E. to E.N.E., distant about 1 mile, when a vessel would be out of the tide stream.

In the strong winds from S.S.E. which prevail during the summer months, when Port Augusta is most frequented, a vessel seeking anchorage for the night or a tide, should, when within point Lowly, haul to the eastward and come to in 6 fathoms, under the lee of Ward spit.

TIDES.—The tides in the northern part of Spencer gulf are very irregular. At Port Augusta, as already stated, it is high water, full and change, at 8h. 30m., and at point Lowly at 7h. The rise at ordinary springs, at the former place varies from 9 to 12 feet, and at the latter, 6 to 8 feet ; but after a strong hot wind, when it veers round to West and South, the tide at Port Augusta has been known to rise 16 feet.

After full and change, the time of high water gets gradually later till the time of neaps, when it is high water between 10h. and 11h., both at Port Augusta and point Lowly. Then a day occurs when the tide ebbs or flows twelve hours together, the whole tide often not ranging more than a few inches. After this the tides again become regular ; but the time of high water has changed to between 5h. and 6h., and gradually returned to the full and change times. It may thus be generally assumed that at Port Augusta high water takes place in the morning and evening, and low water in the middle of the day. At night the tide is generally one or two feet higher than in the morning.

The stream generally sets fairly up and down the gulf channel, $1\frac{1}{2}$ to 2 knots, and changes with the rise and fall, except about the mouths of the small channels through East sands, and to the southward of Douglas bank, where the flood sets N.W. across into the deep channel, the ebb setting out S.E.

WINDS.—During the summer months strong winds from South and S.S.E. prevail ; and in January, February, and March they are often interrupted by hot winds, which blow fiercely from the northward, sometimes for seven or eight days, raising the temperature to 120° in the shade. Commander Hutchison, during a hot wind in March 1862, experienced a maximum temperature of 109° in the shade. During the first eight days of that month the thermometer stood constantly over 90° , and for three days over 100° . The hot winds frequently terminate

in a squall from the southward, or a thunderstorm from S.W. They blow under a cloudless sky, with a thick red haze.

Whirlwinds are common in summer ; but they are usually confined to the plain between Flinders range and the gulf, where several may be seen at once, raising pillars of dust to a great height.

Very little rain falls during the year, and the quantity in that period is very uncertain. The rain-fall observed at Port Augusta during the years 1859, 1860 and 1861, was respectively 2·038, 9·160, and 7·186 inches.

During the months of April and May, some strong northerly winds were experienced, with a hard, cold-looking sky : these winds, although coming from the same quarter as the hot winds, did not raise the temperature above 75° or 80°. During the winter months north-west to south-west winds generally prevail.

CHAPTER III.

AUSTRALIA.—SOUTH COAST, CAPE CATASTROPHE TO CAPE OTWAY, INCLUDING INVESTIGATOR STRAIT, THE GULF OF ST. VINCENT, AND KANGAROO ISLAND.

VARIATION from 4° 40' to 8° East, in 1868.

INVESTIGATOR STRAIT, the most direct channel between Spencer gulf and the gulf of St. Vincent, lies between the north coast of Kangaroo island, from cape Borda to point Marsden, and the south coast of Yorke peninsula, from cape Spencer to Troubridge hill.*

CAPE BORDA, the north-west point of Kangaroo island, and which forms the south-west side of the western entrance of Investigator strait, is situated in lat. 35° 45' 40" S., long. 136° 38' 50" E., and rises to the height of 450 feet, the hills behind it being well wooded. There are 50 to 60 fathoms at about 6 miles to the westward, and 37 fathoms at 3 miles to the northward of it; but the cape should not be approached too closely, especially in light winds, when the swell might set a vessel too near the shore, on which the surf, in westerly winds, breaks with great violence.

RESCUE from SHIPWRECK.—In the event of a vessel being stranded at or near cape Borda, and the lives of the crew being in danger, assistance will, if possible, be rendered from the shore, as directed at page 54.

CAPE BORDA LIGHT exhibits a bright *white* and a *red* light every alternate half-minute. The tower rises to the height of 60 feet above the cape, or 510 feet above the sea level. It is visible from S.W. by S. round by West to N.E. by E. $\frac{1}{2}$ E.: the *white* light may be seen 30 miles off, but the *red* at only half that distance, in which case the *white* light will appear at intervals of one minute.

The south coast of Investigator strait, from cape Borda, trends in an E. by N. $\frac{1}{2}$ N. direction 47 miles to cape D'Estaing, off which is a dangerous reef, partly above water, extending in nearly a parallel direction with the eastern side of the cape, and three-quarters of a mile from the beach. This reef should be carefully avoided, as the soundings give but little warning when approaching it. From cape D'Estaing the coast trends E. by N. $7\frac{1}{2}$ miles to point Marsden.

This coast, which has a monotonous aspect, is mostly steep and cliffy, being apparently free from projecting dangers, with the exception of the

* See Chart of Australia, South Coast, Gulfs of St. Vincent and Spencer, No. 2,389; scale, $m = 0.13$ of an inch.

reef off cape D'Estaing and some rocks, which according to the Admiralty chart, lie close off cape Dutton, 30 miles to the eastward of cape Borda ; and the shore may be generally approached within 2 miles, in 20 to 16 fathoms. But the best information relative to the places where landing may be safely effected will be obtained by reference to the chart.

MARION BAY, N.E. by E. between 6 and $10\frac{1}{2}$ from cape Spencer, is too exposed to afford shelter, except in northerly winds.

TIDES.—It is high water in Marion bay, full and change, at 2h. 6m. ; springs rise 4 feet, the highest tide being after noon. At a mile off shore the ebb sets S.W., and the flood East $1\frac{1}{2}$ knots, at springs.

From Marion bay the coast extends in and out, E. by N. $\frac{3}{4}$ N. 15 miles to Sandy point, from which shoal water projects 3 or 4 miles to the south-eastward. On the east side of Sandy point the low shore forms a deep bight, extending from the point E. $\frac{1}{4}$ S. 14 miles to the foot of Troubridge hill. The shores of this bight cannot be approached within 2 or 3 miles, on account of a shoal flat fronting them. There are 8 and 10 fathoms at $1\frac{1}{2}$ miles off this flat, but the bottom is not good ; and the bight is too much exposed to the southward to afford safe anchorage, except with northerly winds.

Investigator strait extends 52 miles E. by N. $\frac{1}{2}$ N. and W. by S. $\frac{1}{2}$ S., and is 23 miles wide. With the exception of Althorpe isles and the shoal flat off Sandy point, the strait is free from dangers. From 45 fathoms, in the middle of the western entrance of Investigator strait, the depth decreases to 25 and 20 fathoms, after which it is irregular between 12 and 20 fathoms as far as the gulf of St. Vincent, the deepest water being on the south side ; but there is no danger in any part to prevent a ship passing through the strait with perfect confidence. The bottom is mostly broken shells, mixed with sand, gravel, or coral, and appeared to hold well.

TROUBRIDGE SHOALS.—From Troubridge hill the coast trends about N.E. 7 miles to Hungry point, from half a mile to nearly $3\frac{1}{2}$ miles eastward of which lie the Troubridge shoals. These shoals consist of two extensive banks of hard sand, dry at low water, and Marian reef, which lies half a mile to the southward of the western reef, and is covered at low water.*

The eastern, or outer Troubridge shoal is nearly $2\frac{1}{2}$ miles long, N.W. by N. and S.E. by S., and three-quarters of a mile broad. There is a small sandy island nearly half a mile long, and half a cable broad, lying parallel with, and about 2 cables' lengths from the eastern edge of this bank, which forms the site of the light-house.

* See Plan of Troubridge shoals, No. 2,152 ; scale, π = 2 inches.

The LIGHT-HOUSE, which is an iron tower 80 feet above high water, has *red* and *white* stripes, a *white* top, and exhibits a bright light without colour, visible 24 seconds in every minute, and may be seen from all points of the compass at a distance of 16 miles, in clear weather, from the deck of an ordinary-sized vessel. Seamen should not, however, estimate their distance from the time of their first making the light, as, owing to refraction, it is often seen from distances when the lantern is considerably below the line of the natural horizon. From the light-house the south-east and north-west extremes of the shoal on which it stands, lie S. by E. $\frac{1}{2}$ E. $1\frac{1}{10}$ miles and N.W. $\frac{1}{4}$ W. $1\frac{4}{10}$ miles.

The western or inner Troubridge shoal extends from one-third of a mile south-westward of the south-east extreme of the eastern shoal to N.N.E. 1 mile from Hungry point. The north-western part forms a spit one quarter of a mile to 2 cables broad, curving $1\frac{1}{4}$ miles to the north-westward and northward. Another spit projects south-westward to $1\frac{1}{4}$ miles S.E. by S. of Hungry point.

Sultana Reef, on which a vessel of that name was wrecked, consists of some red sandstone rocks on the southern edge of the western Troubridge shoal.

MARIAN REEF, so named from the *Marian* having been wrecked on it, lies about half a mile to the southward of the western Troubridge shoal, and is covered at low water. This reef is three-quarters of a mile long, E.N.E. and W.S.W., and about 1 cable broad, with its eastern extreme lying South 2 miles from the light-house. There is a 4-fathoms passage, 1 to 3 cables wide, between this reef and the shoal to the northward of it.

TROUBRIDGE HARBOUR, the space between the inner and outer Troubridge shoals, is $1\frac{1}{2}$ miles across at its northern entrance, from whence it narrows south-eastward to a width of 2 cables in Sullock channel, between the south-east ends of the two shoals.

The INNER CHANNEL, between Troubridge shoals and the mainland, passes close to Hungry point, where it is only about 1 cable wide, with 3 to 4 fathoms ; but it may be found useful to coasters, to save them from going round the shoals.

There is said to be shoal water on rocky patches, at least 3 miles to the southward and south-westward of the light-house.

TAPLEY SHOAL.—From Troubridge light the south extreme of Tapley shoal lies E. $\frac{1}{2}$ N. $3\frac{1}{2}$ miles, and from thence its outer edge trends $1\frac{1}{4}$ miles in an E.N.E. direction to its south-east point, on which there are 21 feet water ; from this point the edge of the shoal extends $3\frac{1}{2}$ miles northward to its north-east extreme, where there are 16 feet water, the least depth which appears to have been yet discovered on the shoal, and from

which the light-house bears S.W. $\frac{1}{2}$ W., distant 6 miles. From hence the edge of the shoal, after turning north-westward for about 2 miles, returns 3 miles to the southward, then trends West 1 mile and South about the same distance.

The depth of water on Tapley shoal is very irregular, varying from 16 feet to 7 fathoms, over an uneven bottom of sand and weed. The bottom in fine weather, can be easily seen, the sand showing very distinctly in relief, between the dark patches of weed. Although great care was taken to ascertain the most shallow patch on this extensive shoal, it may be possible, and not improbable, that less than 16 feet water may be found upon it ; and owing to the rapidity of the tide streams and the effect they may produce, by heaping up the sand and weed of which the bottom is composed, the soundings given on the chart may at some future time be either reduced or increased in some places.

Tapley shoal offers no impediment in proceeding up the gulf of St. Vincent ; but to vessels bound down, meeting unsteady winds, and trying to keep the weather shore aboard, it will be found to be directly in their track, and should be carefully avoided in deeply-laden vessels, by keeping the tops of the houses on the island dipping, as observed from the poop of a moderate-sized vessel, when the light-house bears S.W. to West.

MACDONNELL SOUND, the space between Tapley and Troubridge shoals and the main-land, extends 7 miles East and West, and $3\frac{1}{2}$ miles North and South, with 5 to 10 fathoms water, and affords good and safe anchorage in 7 to 9 fathoms, under the lee of Troubridge shoals, with the light-house bearing South to S.E., distant 2 or 3 miles ; and there appears to be still more sheltered anchorage in Troubridge harbour, between the two shoals.

Vessels bound down the gulf of St. Vincent against strong south or south-west gales, are strongly recommended to avail themselves of the anchorage in Macdonnell sound, as it is almost impossible for a deeply-laden vessel to contend against the strong tide streams, which from the direction of the winds, act more adversely than favourably for a vessel working to windward.

The coast which forms the west side of Macdonnell sound, extends from Hungry point about $4\frac{1}{2}$ miles in a northerly direction to Giles point. The northern portion forms a bight $1\frac{1}{2}$ miles deep ; but it appears to be mostly occupied by shoals.

TIDES.—It is high water at Troubridge shoals, full and change, at 3h. 30m. ; ordinary springs rise 6 to 7 feet, but they are much influenced by the winds.

DIRECTIONS for INVESTIGATOR STRAIT and TROUBRIDGE SHOALS.—Vessels bound through Investigator strait from the westward

should, after making the west end of Kangaroo island, steer between that island and Althorpe isles, keeping Kangaroo island in sight while passing through the strait.

If bound up the gulf of St. Vincent to Port Adelaide, continue eastward until point Marsden bears S.W. by W., distant about 18 miles; N.W. bluff, the high land 6 miles northward of cape Jarvis, will then bear S.E., distant about 10 miles; from this position the vessel may shape a N.N.E. course for the light-vessel off the bar of Port Adelaide, which would then bear N.N.E., distant about 42 miles.

Commander Lipson strongly recommends bearings being taken in Investigator strait as often as possible to fix the position of the vessel, which should never be to the northward of mid-channel; she will then be in the fairway, and the distance from Troubridge shoals may be roughly estimated by the soundings. If, on the contrary, the vessel gets too near the north side of the strait, the tide stream will set her along the coast, where the soundings, varying but little, will not give timely notice of nearing the shoals.

Troubridge shoals should be approached with great caution, as, when within 4 miles of them, a stranger cannot be aware of the force with which the flood stream sets directly upon them, both from Investigator strait and from the southward, through Backstairs passage.

Should the wind be to the northward of West, and it be desirable to keep to windward, great attention must be paid to the bearings and soundings to avoid Troubridge shoals, which a stranger ought not to approach in less than 12 fathoms, when they will be distant $1\frac{1}{2}$ miles.

In clear weather, when Troubridge light may be seen at its greatest range, a vessel bound up the gulf of St. Vincent may bring the light to bear N.E. $\frac{1}{2}$ N., distant 16 miles, and steer N.E. by E. $\frac{1}{2}$ E. until it bears W. by N. $\frac{1}{2}$ N., distant 8 or 10 miles, when a north-easterly course may be shaped for the light vessel off the bar of Port Adelaide, distant about 30 miles.

KANGAROO ISLAND, at the entrance of the gulf of St. Vincent, is 76 miles long East, and West, and about 24 miles broad, resembling in shape the Malay kris or dagger, with its handle to the eastward. The land is of good elevation and well wooded.

From cape Borda the high cliffy western coast of Kangaroo island trends South 11 miles to cape Bedout. At about 3 miles southward from cape Borda is the Ravine de Cascoars, a remarkable gorge. The coast in this locality assumes a more rugged aspect, straggling detached masses appearing out of water, with the sea breaking over them with great violence.

This part of the coast should be carefully avoided during light winds, when the ocean swell rolls in with considerable velocity; in westerly gales

the sea is very-heavy, and gives little chance to any vessel which might be set upon the dangerous coast between capes Borda and Bedout.

CAPE BEDOUT, ISLET and REEF.—There is a small low islet close off cape Bedout, connected with a reef extending more than a mile to the north-westward and westward. Anchorage for coasters may be found within the reef, in West bay, a slight indentation of the coast immediately to the northward of the cape. This anchorage has been occasionally used by sealers and the inhabitants of the island; it is, however, quite open to the westward.

Vessels should give cape Bedout a wide berth, as the sea breaks at a considerable distance off shore; owing, doubtless, more to the nature of the bottom than to the shallowness of the water. Rocks do, however, lie along this shore, on which the swell breaks with great violence.

MAUPERTIUS BAY is a slight indentation of the coast extending from cape Bedout S.E. $\frac{1}{2}$ E. 12 miles to cape Couëdie, the south-west point of Kangaroo island. This part of the coast is little known, but its aspect at a distance, seemed similar to that northward of it.

CAPE COUËDIE and CASUARINA ISLETS.—The land about cape Couëdie is high, and may be seen at the distance of 20 miles, in clear weather. The Casuarinas are two rocky islets, named by the islanders, the Brothers, the outer islet bearing S.S.W., distant $1\frac{1}{2}$ miles from the cape. As an extensive reef appears to surround these islets, passing vessels should give them a good berth.

HANSON BAY.—DOUGLAS ROCK.—From cape Couëdie the coast trends N.E. by E. $2\frac{1}{2}$ miles to cape Younghusband, the west point of Hanson bay, which extends from thence E. $\frac{3}{4}$ N. $6\frac{1}{2}$ miles to cape Bouguer, and is 3 miles deep; but it affords no anchorage. Douglas rock, a sunken danger which lies near the centre of Hanson bay, may be easily avoided by not bringing cape Couëdie to bear to the westward of W. by N. As the sea does not always break on this rock, the bay should be approached with caution. In the north-east part of Hanson bay there is an extensive salt water creek, which does not appear to have been explored.

LIPSON REEF, S.E. $\frac{1}{2}$ E. 7 miles from cape Couëdie, is a rocky ledge about 10 feet above water, on which the sea breaks with very great violence.

CAPE KERSAINT.—From cape Bouguer a precipitous rocky coast, 200 feet high, extends E. $\frac{1}{2}$ N. 12 miles to cape Kersaint, a bold cliffy headland, from which the coast trends N.E. 5 miles to point Ellen, a low rocky projection, which when seen from the south-westward, appears in relief against the sandy beach beyond it, and which forms the west point of Vivonne bay.

Soundings in 20 to 40 fathoms were obtained between 1 and 6 miles from the coast, and no dangers were observed off shore; as, however, the south-west swell rolls in with great force upon this iron-bound part of the island, an offing of a least a couple of miles should be kept till cape Kersaint bears North.

THE SNARES form a reef of covered rocks extending from 2 miles S. by E. to 4 miles E.S.E. of point Ellen. These rocks are generally shown by broken water; but when there is not sufficient wind to cause breakers, these dangers may be approached without being perceived. As they, however, lie 2 miles off Vivonne bay, with deep water all around them, they may be avoided with ordinary precaution.

VIVONNE BAY extends from point Ellen E. $\frac{3}{4}$ N. $4\frac{1}{2}$ miles to Nobby point, and is nearly 2 miles deep in its north-west bight, which is so far protected as to afford perfect shelter from all winds, except those from S.E. The soundings in the bay vary from 6 to 7 fathoms, with point Ellen bearing South, to 3 fathoms with the point bearing S.E.; and the holding ground is good and clear. This place of shelter might prove of essential advantage to vessels when overtaken by heavy weather in the vicinity of this otherwise exposed line of coast.

In approaching Vivonne bay from the southward, two remarkable peaked sand-hills will be observed,—mount Bloomfield, near the middle of the bay, and mount Mary, 1 mile north-westward of mount Bloomfield. Eleanor and Harriet rivers are two small streams which flow into the bight between mount Mary and point Ellen.

DIRECTIONS.—Having from the westward, passed cape Kersaint a vessel, by keeping point Ellen bearing N. by E. $\frac{1}{4}$ E., in line with a high sand-hill at the mouth of Eleanor river, will clear the west rock of the Snares, and, having brought the point to bear West, may round it at the distance of 2 cables' lengths, and stand into the anchorage to the northward of point Ellen, choosing a berth according to draught of water.

ANCHORAGE.—The best berth is with a small rocky projection in the bight of Vivonne bay bearing West, and point Ellen from S.S.E. to S.E. by E. After a continuation of southerly gales a considerable swell breaks on the point, but with good ground tackle a vessel will ride safely.

Vessels entering Vivonne bay from the eastward, should keep within 2 miles of the coast, to avoid the eastern part of the Snares; no vessel should, however, go within a mile of the beach, as a very hollow sea sometimes rolls in. By keeping point Ellen bearing W. by N. $\frac{1}{2}$ N. a direct course may be made, and all danger easily avoided.

In landing, the sandy beach between point Ellen and the rocky projection above alluded to, will be found the most convenient place ; but some care must be taken in beaching boats, as in many places the rocks crop out from the sand.

Water.—Good water may be obtained on the western bank of Eleanor river, by cleansing the whalers' old wells, which will be found among some dwarf tea-tree scrub at the foot of the sand-hills. Should there be much surf on the shore, the water casks must be rolled along the beach to a more sheltered part of the bay than that where the wells are.

In Harriet river great quantities of fish were caught with the seine by the crew of the *Yatala*.

The country inland from Vivonne bay is of a very poor description, it being chiefly of a calcareous sandy upper stratum on a granite base, there was a considerable sheet of salt water discovered inland from the bay.

CAPE GANTHEAUME.—From the Nobby, or east extreme of Vivonne bay the coast trends East and south-eastward 11 miles to cape Gantheaume, a moderately elevated headland, from which a reef projects about one mile in a S.S.E. direction, with the sea generally breaking on its outer extremity.

QUIN ROCK, 3 miles westward of cape Gantheaume, is awash, and may be easily avoided by keeping Pelorus rock, off the cape, bearing E. $\frac{3}{4}$ S. $\frac{1}{2}$ S.

PELORUS ROCK, S.E. $\frac{1}{4}$ E. about 3 miles from cape Gantheaume, rises to the height of 30 or 40 feet, and has a reef extending about half a mile to the eastward. The channel between this rock and the main-land is quite safe, having about 24 fathoms in its centre.

MITCHIE REEF.—During the colonial survey in 1858, minute, but unsuccessful search was made for the reef reported to have been seen by Mr. Mitchie, of the British ship *Phæbe Dunbar*, in lat. $36^{\circ} 33' S.$, long. $136^{\circ} 32' E.$; it is therefore presumed that the reef seen by him was no other than Young rocks, E.N.E. 42 miles from this position, as he states that the sea broke in several spots. The currents on the south side of Kangaroo island being very strong after a continuation of westerly winds, it is not at all improbable that Mr. Mitchie might have been set to the eastward, and that the error had thus arisen.

During the search for this supposed danger the weather was most favourable for the purpose, for, although the wind was light, the swell was so very heavy, that a break could have been discerned from aloft at a considerable distance.

Commanders of vessels in the vicinity of the supposed position of Mitchie reef will only be acting with common prudence if they keep a

good look-out; but from the very careful search made, it is extremely improbable that the danger, as reported, exists in that locality.

YOUNG ROCKS lie E.N.E. 42 miles from the doubtful Mitchie reef, and nearly S.S.W. between 16 and 20 miles from cape Gantheaume. The most central and elevated of these rocks, in lat. $36^{\circ} 20' 30''$ S., long. $137^{\circ} 22' 0''$ E., is 30 feet high, and has a few straggling rocks extending in an E.N.E. direction a quarter of a mile from it.

At about $1\frac{1}{4}$ miles to the south-westward of the central rock is situated the outer rock of the group. This danger is about 6 feet above the sea, with a few detached rocks surrounding it, and being the lowest and outside rock of the group, is the most dangerous of them, and should be carefully avoided in thick weather.

The north rock, $2\frac{1}{2}$ miles northward of the central rock, is 10 feet above water, and about 60 feet in diameter; the top appears quite smooth, and no outlying rocks seem to exist in its immediate vicinity. Soundings in 35 fathoms, coarse sand and coral, were obtained at half a mile to the westward of this danger.

At 2 or 3 miles to the southward of Young rocks there are regular soundings in 45 fathoms, and these dangers may be avoided at night, by not getting into less than 50 fathoms; but it would be better to keep so far in the offing as to carry not less than 60 fathoms, for any inaccuracy in getting soundings might lead to a dangerous proximity to the rocks.

THE SOUNDINGS on the south side of Kangaroo island are very regular. At S.W. 2 miles from the assigned position of Mitchie reef, there was no bottom at 85 fathoms; at N.E., 2 miles from that spot, there were 75 fathoms, coarse sand: from this depth the soundings gradually decreased to 45 fathoms, on a bottom composed of sand and coral, within 3 miles E.S.E. of Lipson reef. From the assumed position of Mitchie reef to Young rocks the depth gradually decreases from 75 to 45 fathoms, and from Young rocks to cape Gantheaume there are 38 to 24 fathoms.

POINT TINLINE.—The coast from cape Gantheaume trends N.E. $\frac{3}{4}$ E. 5 miles to cape Linois, and from thence N.N.E. $\frac{1}{2}$ E. 4 miles to point Tinline, a low limestone projection, with a remarkable detached arched rock? forming the south-west point of D'Estree bay. The coast from cape Gantheaume to cape Linois is high, and may be approached within a mile in safety, after clearing the reef off the former cape.

D'ESTREE BAY extends from point Tinline N.N.E. $\frac{3}{4}$ E. $7\frac{1}{2}$ miles to point Reynolds, and is $2\frac{1}{2}$ miles deep; the shore is bold and safe to approach within $1\frac{1}{2}$ miles. The western bight of this bay is a valuable harbour of refuge on this part of the coast; it may be entered with perfect

safety by day, and without much risk at night, provided the position of the vessel be ascertained before the shore is too closely approached, and care be taken to avoid Osmaldi reef, which extends about half a mile from point Tinline.*

DIRECTIONS.—To enter D'Estree bay from the south-westward, give point Tinline a berth of at least 1 mile, when the vessel may haul into the bay and anchor in 4 or 5 fathoms, with the arched rock bearing South. The bottom at these depths is sandy, with occasional patches of limestone crust; the anchor will draw over the rocky portions of the bottom, but generally holds well in the sand, which mostly prevails at this anchorage.

At Night.—In entering at night preference should be given to the more northerly part of D'Estree bay, so as to avoid Osmaldi reef.

Water.—Fresh water will be found at the foot of some sand-hills between cape Linois and the arched rock; and a ship's boat will find shelter within the reefs, which run parallel with the coast at about one-third of a mile from the shore.

FALSE CAPE.—From Pennington bay, a small bight 2 miles to the north-eastward of point Reynolds, the coast trends E. $\frac{3}{4}$ N. $5\frac{1}{2}$ miles, and then in an E.S.E. direction 7 miles to False cape, a bold headland, having a reef stretching out about half a mile to the southward. The coast from D'Estree bay to False cape is bold, and may be approached within $1\frac{1}{2}$ miles. Immediately behind Pennington bay Prospect hill rises on a narrow isthmus which connects Macdonnell peninsula with the main body of Kangaroo island; and at 9 miles to the eastward of the hill is Hog bay river.

CAPE HART.—From False cape the coast trends E. $\frac{1}{2}$ N. 3 miles to cape Hart, and from thence N.E. 4 miles to cape Willoughby.

SOUNDINGS.—TIDE RACE.—Off cape Hart, and between that point and D'Estree bay, the soundings are deep and regular, there being generally 20 to 22 fathoms within a mile of the shore. From Young rocks to cape Willoughby the soundings are tolerably regular, decreasing gradually from 44 fathoms at 4 miles eastward of the rocks to 21 fathoms at 3 miles southward of the cape. An extensive tide race is represented on the chart at 10 miles southward of cape Willoughby.

CAPE WILLOUGHBY and STURT LIGHT.—Cape Willoughby, the south-east extremity of Kangaroo island, is a bold rocky headland 173 feet

* The steam vessel *Osmaldi* was lost on Osmaldi reef in 1854, through a westerly error of at least 25 miles in the reckoning of the master of the vessel, who mistook, at night, the low land at the head of the bay for Backstairs passage, supposing cape Linois was cape Willoughby, and that Sturt light was extinguished.

high, on the summit of which stands Sturt light-house, in lat. $35^{\circ} 51' 33''$ S., long. $138^{\circ} 10' 50''$ E. The tower, which is *white*, is 75 feet high, or 248 feet above high-water level, exhibiting a revolving catoptric light; its greatest brilliancy, which appears every one-and-a-half minutes, may be seen in clear weather, from the deck of a vessel at a distance of 24 miles, and is visible on all bearings from N. by W. $\frac{1}{4}$ W. round by East to S.W. $\frac{1}{4}$ W.

RESCUE from SHIPWRECK.—In the event of a vessel being stranded at or near cape Willoughby, and the lives of the crew being in danger, assistance will, if possible, be rendered from the shore, as directed at page 54.

TIDES.—It is high water at cape Willoughby, full and change, at 4h. 10m.; springs rise 6 feet. To the northward of the cape the flood sets to the northward and the ebb to the southward.

SCRAPER SHOAL.—From cape Willoughby the coast trends in a N. by W. direction $2\frac{1}{2}$ miles to cape St. Albans, and at about half a mile south-eastward of the latter cape, and North 2 miles from the former, is Scraper shoal, having a passage 1 cable wide between it and the shore. The shoal is at times nearly dry, and in stormy weather, the breakers mark its position; but it should be carefully avoided by vessels keeping this part of the coast aboard, as the tide streams run with great rapidity in its vicinity, and set directly over the shoal. In fine weather, with smooth water, the tide ripples show the position of the shoal. There are 4 fathoms water in the passage between the shore and Scraper shoal, and 7 fathoms close to its eastern edge.

ANTICHAMBER BAY is formed between cape St. Albans to the S.E., and cape Coutts to the N.W., the distance between these headlands being $3\frac{3}{4}$ miles. Cape Coutts is bold high land, with soundings in 14 fathoms within 100 yards of the shore. The bight of the bay, which is $1\frac{1}{2}$ miles deep, is bordered by a sandy beach, with soundings gradually shoaling towards the shore. In its north-west part, under the high land of cape Coutts, the coast is steep and rocky; in its southern part it is somewhat foul, and no vessel of any considerable draught, should anchor in less than $3\frac{1}{2}$ fathoms, at low water. This latter part, however, is only frequented by vessels employed by the government to take supplies to the light-house.

This bay affords a most convenient anchorage for vessels bound through Backstairs passage meeting with head winds during contrary tides. The soundings in it vary from 9 to 3 fathoms, and any part of the bay is available, according to the direction of the wind. From its position it would appear to a stranger, that during winds from E.S.E. a heavy sea would enter the bay; such, however, is not the case, as the strong

reef off cape D'Estaing and some rocks, which according to the Admiralty chart, lie close off cape Dutton, 30 miles to the eastward of cape Borda ; and the shore may be generally approached within 2 miles, in 20 to 16 fathoms. But the best information relative to the places where landing may be safely effected will be obtained by reference to the chart.

MARION BAY, N.E. by E. between 6 and $10\frac{1}{2}$ from cape Spencer, is too exposed to afford shelter, except in northerly winds.

TIDES.—It is high water in Marion bay, full and change, at 2h. 6m. ; springs rise 4 feet, the highest tide being after noon. At a mile off shore the ebb sets S.W., and the flood East $1\frac{1}{2}$ knots, at springs.

From Marion bay the coast extends in and out, E. by N. $\frac{3}{4}$ N. 15 miles to Sandy point, from which shoal water projects 3 or 4 miles to the south-eastward. On the east side of Sandy point the low shore forms a deep bight, extending from the point E. $\frac{1}{4}$ S. 14 miles to the foot of Troubridge hill. The shores of this bight cannot be approached within 2 or 3 miles, on account of a shoal flat fronting them. There are 8 and 10 fathoms at $1\frac{1}{2}$ miles off this flat, but the bottom is not good ; and the bight is too much exposed to the southward to afford safe anchorage, except with northerly winds.

Investigator strait extends 52 miles E. by N. $\frac{1}{2}$ N. and W. by S. $\frac{1}{2}$ S., and is 23 miles wide. With the exception of Althorpe isles and the shoal flat off Sandy point, the strait is free from dangers. From 45 fathoms, in the middle of the western entrance of Investigator strait, the depth decreases to 25 and 20 fathoms, after which it is irregular between 12 and 20 fathoms as far as the gulf of St. Vincent, the deepest water being on the south side ; but there is no danger in any part to prevent a ship passing through the strait with perfect confidence. The bottom is mostly broken shells, mixed with sand, gravel, or coral, and appeared to hold well.

TROUBRIDGE SHOALS.—From Troubridge hill the coast trends about N.E. 7 miles to Hungry point, from half a mile to nearly $3\frac{1}{2}$ miles eastward of which lie the Troubridge shoals. These shoals consist of two extensive banks of hard sand, dry at low water, and Marian reef, which lies half a mile to the southward of the western reef, and is covered at low water.*

The eastern, or outer Troubridge shoal is nearly $2\frac{1}{2}$ miles long, N.W. by N. and S.E. by S., and three-quarters of a mile broad. There is a small sandy island nearly half a mile long, and half a cable broad, lying parallel with, and about 2 cables' lengths from the eastern edge of this bank, which forms the site of the light-house.

* See Plan of Troubridge shoals, No. 2,152 ; scale, $\pi = 2$ inches.

The LIGHT-HOUSE, which is an iron tower 80 feet above high water, has *red* and *white* stripes, a *white* top, and exhibits a bright light without colour, visible 24 seconds in every minute, and may be seen from all points of the compass at a distance of 16 miles, in clear weather, from the deck of an ordinary-sized vessel. Seamen should not, however, estimate their distance from the time of their first making the light, as, owing to refraction, it is often seen from distances when the lantern is considerably below the line of the natural horizon. From the light-house the south-east and north-west extremes of the shoal on which it stands, lie S. by E. $\frac{1}{2}$ E. $1\frac{1}{10}$ miles and N.W. $\frac{1}{4}$ W. $1\frac{4}{10}$ miles.

The western or inner Troubridge shoal extends from one-third of a mile south-westward of the south-east extreme of the eastern shoal to N.N.E. 1 mile from Hungry point. The north-western part forms a spit one quarter of a mile to 2 cables broad, curving $1\frac{1}{4}$ miles to the north-westward and northward. Another spit projects south-westward to $1\frac{1}{4}$ miles S.E. by S. of Hungry point.

Sultana Reef, on which a vessel of that name was wrecked, consists of some red sandstone rocks on the southern edge of the western Troubridge shoal.

MARIAN REEF, so named from the *Marian* having been wrecked on it, lies about half a mile to the southward of the western Troubridge shoal, and is covered at low water. This reef is three-quarters of a mile long, E.N.E. and W.S.W., and about 1 cable broad, with its eastern extreme lying South 2 miles from the light-house. There is a 4-fathoms passage, 1 to 3 cables wide, between this reef and the shoal to the northward of it.

TROUBRIDGE HARBOUR, the space between the inner and outer Troubridge shoals, is $1\frac{1}{2}$ miles across at its northern entrance, from whence it narrows south-eastward to a width of 2 cables in Sullock channel, between the south-east ends of the two shoals.

The INNER CHANNEL, between Troubridge shoals and the mainland, passes close to Hungry point, where it is only about 1 cable wide, with 3 to 4 fathoms; but it may be found useful to coasters, to save them from going round the shoals.

There is said to be shoal water on rocky patches, at least 3 miles to the southward and south-westward of the light-house.

TAPLEY SHOAL.—From Troubridge light the south extreme of Tapley shoal lies E. $\frac{1}{2}$ N. $3\frac{1}{2}$ miles, and from thence its outer edge trends $1\frac{1}{2}$ miles in an E.N.E. direction to its south-east point, on which there are 21 feet water; from this point the edge of the shoal extends $3\frac{1}{2}$ miles northward to its north-east extreme, where there are 16 feet water, the least depth which appears to have been yet discovered on the shoal, and from

During strong gales, when the tide stream meets the sea, the swell off cape Willoughby is very heavy, against which it is quite useless to contend in a small vessel, as immediately the limit of the stream is lost, the effects of the bad weather outside will prevent a sufficient offing being gained before the indraught of the flood sets the vessel into the passage again. Under these circumstances much loss of time, and frequently loss of gear, may be avoided by seeking anchorage, so conveniently afforded, in Antichamber bay.

KANGAROO HEAD is a bold projection forming the eastern point of Nepean bay and Eastern cove. Westerly winds meeting the flood stream off the head cause a strong ripple, which might be taken for a shoal. There is, however, plenty of water; but it is dangerous for open boats, unless great care is observed.

NEPEAN BAY, which includes Eastern cove with Pelican lagoon, Western cove with Kingscote harbour, and the Bay of shoals, stretches across from Kangaroo head N.W. by W. $\frac{1}{4}$ W. 15 miles to point Marsden.

EASTERN COVE extends from Kangaroo head S.W. by W. $\frac{1}{4}$ W. 5 miles to Ballast head. From the former head the eastern and southern shores trend S. by W. $\frac{1}{2}$ W. 5 miles and West 4 miles to the entrance of Pelican lagoon, and from thence the western shore turns N.E. $\frac{1}{2}$ N. $2\frac{1}{2}$ miles to Ballast head; the bight having a sandy beach. Shoal water extends half a mile to a quarter of a mile from these shores, and spits stretch out somewhat farther from the entrance points of Pelican lagoon.

ANCHORAGE.—The whole of Eastern cove affords good anchorage, except within a line from Ballast head to the south shore, touching the end of the east entrance spit of Pelican lagoon. Depths of 7 to 3 fathoms will be found, generally on a sandy bottom; and a berth may be easily picked up, according to the direction of the winds, by attention to the lead. But an anchorage should not, however, be selected at 2 miles southward of Kangaroo head, as the bottom is more objectionable than in any other part of Eastern cove. During north-west winds a vessel should anchor as close to the western shore as prudent, observing that that side of the cove has the shoalest water.

Eastern cove is principally frequented by coasters and the small craft belonging to the Colony, overtaken by bad weather from the north-westward, at the out-ports in the gulf of St. Vincent. There is, however, no reason why vessels of a larger class, when seeking shelter, should not take advantage of this fine bay; as a ship will often fetch into Eastern cove, when a day's hard work would be requisite to work up, during westerly gales, to the anchorage under point Marsden or into Kingscote harbour. Large vessels, from their draught, will not obtain much shelter from

northerly winds, as they are obliged to lie too far from under the lee of Ballast head.

PELICAN LAGOON.—The entrance of Pelican lagoon, in the south-west bight of Eastern cove, has a bar, with 8 feet on its shoalest part, at low water, springs, between the entrance spits. From thence a narrow channel trends south-westward about 2 miles into the west end of the lagoon, after passing on the west side of two small islets.

The lagoon is nearly 3 miles long, East and West, and 1 mile wide, with a branch, dry at low water, springs, trending south-westward to the foot of Prospect hill, and within 1 mile of the south coast of Kangaroo island. There are four small islets in the eastern branch, one of them being moderately elevated and woody, and the others lower and grassy.

DIRECTIONS.—In entering Pelican lagoon a stake will be observed on the eastern bank, near the bar, which will enable a stranger to find the channel in, by paying attention to the soundings and the colour of the water. Should the stake or beacon be removed, the entrance of the channel to the lagoon may be readily ascertained by standing in with the points on each side of the opening overlapping,—the eastern point covering the western; a good look-out will then easily enable the passage to be discerned, by the colour of the water.

Having passed the bar, proceed in mid channel, drawing rather to the westward, until the points open, when run in and anchor, in 2 to 3½ fathoms, off the inner or western point.

Water may be obtained near the cottage at the west side of the entrance.

TIDES.—It is high water in Pelican lagoon, full and change, at 5h.; rise, 6 feet. The streams are rapid and irregular.

POINT MORRISON.—From Ballast head the coast trends N.W. ½ N. 2½ miles to point Morrison, a headland of moderate elevation, having a few straggling rocks at a cable's length off it. The coast between the head and point is bold, with deep water within 2 cables' lengths of the beach.

WESTERN COVE.—From point Morrison the southern shore of Western cove trends W. by S. ½ S. about 2 miles to some bright red cliffs, at 1 mile off the western extreme of which lies the Frenchman rock, with 12 feet water on it. After continuing 4 miles farther in the W. by S. ½ S. direction, the shore curves round northward and north-eastward 6 miles to point Beare, which lies W.N.W. 6¼ miles from point Morrison, and forms the north-western point of the cove. This is a clear bay, having gradually decreasing soundings from 5 fathoms in line between the entrance points to 2 fathoms towards the sandy beach.

KINGSCOTE HARBOUR.—From point Beare the coast trends N. $\frac{3}{4}$ W. about $1\frac{1}{4}$ miles to Kingscote bluff, and forms the west side of Kingscote harbour, a very convenient and secure anchorage, protected from the northward and eastward by a shoal, which forms a spit stretching in a S.E. direction 5 miles from point Marsden; this shoal is composed of sand, and dries at low water, to a considerable extent.

DIRECTIONS.—To enter Kingscote harbour from the eastward, steer to pass 1 mile northward of point Morrison; Kingscote bluff will then bear W. by N. $\frac{3}{4}$ N. a little northerly, and the depth of water will be about 7 fathoms. From this position steer W. by N., keeping point Beare, which is lower than the bluff, a little on the starboard bow; on this course the soundings will gradually decrease from 7 to 4 fathoms.

Small vessels may proceed close in to the point, on which stands the township, by keeping the lead going and choosing a berth according to her draught. A large vessel would find good anchorage, in not less than 4 fathoms, at low water, springs, with a white house under the bluff bearing N.W. $\frac{3}{4}$ W. and point Marsden N.N.W. $\frac{1}{4}$ W.; in this position a ship would be sheltered from all winds, except those from the eastward, which rarely or ever blow with sufficient force to cause a sea that would inconvenience a large vessel. A vessel might haul close in shore to discharge cargo.

From Westward.—A vessel bound to Kingscote harbour from the westward, making Kangaroo island at night, is recommended to keep under easy sail, so as to make point Marsden by daylight; the strength of the tide streams rendering it unsafe for a stranger to lie to in this passage. Having brought point Marsden to bear South, distant 1 mile, steer S.E. by E. for Kangaroo head, until the red cliffs 2 miles westward of point Morrison bear South, when the course may be altered so as to steer directly towards the eastern or brightest part of them, until Kingscote bluff bears W.N.W., when the same directions may be followed as given for the guidance of vessels coming from the eastward.

In rounding the end of the spit which extends from point Marsden, great attention should be paid to the soundings; by keeping outside 4 fathoms, and having a good look-out aloft, no difficulty nor danger need be apprehended in going into or out of the harbour.

Working out.—In working out of Kingscote harbour a long board may be made into Western cove, attending to the lead and keeping a full mile from the beach to avoid Frenchman rock.

Supplies.—Water.—Excellent vegetables may be procured at Kingscote, and wood and water may be got off without much difficulty. The well is situated on a small flat at the foot of the hill.

TIDES.—It is high water in Kingscote harbour, full and change, at 3h.;

rise, about 5 feet: but much depends upon the direction of the prevailing winds and the state of the weather.

THE BAY OF SHOALS is 3 miles across N. by W. $\frac{1}{4}$ W., from Kingscote bluff to the south extreme of point Marsden, and is 3 miles deep; but it is, as may be supposed from its name, so full of shoals as to require no farther notice.

POINT MARSDEN, the northern extremity of Kangaroo island, is a bold clifly headland projecting in an E.N.E. direction nearly 4 miles from the line of coast; it is about $1\frac{1}{2}$ miles broad at its extremity, and is moderately elevated, but somewhat lower than the land to the westward.

There is good anchorage under the lee of point Marsden in 7 to 4 fathoms, clean sandy bottom, with the extremity of the point bearing N.W. to West. To vessels bound to the westward, meeting contrary gales, this anchorage affords good shelter; and by paying attention to the lead and to the bearings of the point, may be taken advantage of by night with nearly the same facility as during the day.

CAPE JERVIS, which forms the south-eastern entrance point of the gulf of St. Vincent, is a high bold headland, having but little vegetation. It is intersected by gullies, and has several clifly projections, the westernmost and most prominent of which is in lat. $35^{\circ} 38'$ S., long. $138^{\circ} 9'$ E., and is referred to as *the* cape; although this does not present so steep a face to the sea as the other projections, but gradually slopes down 2 miles from the heights inland. There is a convenient little boat-harbour within the rocks, which extend about 2 cables' lengths from the north-west side of the cape; off which the soundings rapidly increase from 4 to 11 fathoms. From the extremity of the cape the coast trends N. by E. $\frac{1}{4}$ E. 6 miles to N.W. bluff.

THE GULF OF ST. VINCENT is formed between the east shore of Yorke peninsula and a range of moderately elevated hills, which extend to the northward, in continuation of those over cape Jervis. The breadth of its entrance between that cape and Troubridge hill, which bears N.W. from it, is nearly 34 miles; and in this space there are regular soundings in 18 to 20 fathoms, which decrease to 12 and 11 on approaching within 4 miles of Troubridge shoals, and afterwards deepen to 22 in mid-channel to the eastward. On the eastern shore of the gulf, abreast of these shoals, there are some patches of cliffs, with 20 fathoms at 9 miles West from them, and 15 fathoms within 3 miles. From the centre of the entrance the gulf extends nearly 80 miles to the northward, gradually decreasing in width from the entrance to the head of the gulf.

SECOND VALLEY.—From N.W. bluff the coast curves East and N.E. by E. about 5 miles to Second valley, a little cove formed by a

slight indentation of the coast, affording to small vessels some protection from southerly winds by a rocky point, on which a wharf, with a tramway, has been erected.

There is deep water close to the rocky point which forms the western horn of this little bight; but as the anchorage is exposed to all winds from W.S.W., round by N.W., to N.N.E., and a heavy sea sets in on the approach of a westerly gale, coasters should leave this exposed anchorage with the first sign of bad weather.

MOORINGS.—For the convenience of coasters, not exceeding 100 tons, moorings have been laid down consisting of 90 fathoms of $1\frac{1}{2}$ -inch chain, with its inshore end attached to the heavy timber of the wharf, and its other extremity fast to an anchor of 25 cwt. To these chains are secured, in 4 and 5 fathoms, respectively, 1-inch chains 15 fathoms long, having buoys to which masters of vessels using these moorings may shackle on their own cables and veer according to the state of the weather.

TIDES.—It is high water in Second valley, full and change, at 3h 20m. rise, 6 feet.

YANKALILLA, N.E. $4\frac{1}{2}$ miles from Second valley, has a jetty erected close to the northward of Bungala river, which intersects a sandy beach, extending to Carrickalinga, a bold headland N. by E. $\frac{3}{4}$ E. $4\frac{1}{2}$ miles from the river. Soundings off the jetty decrease from 5 fathoms, on a sandy bottom, at 1 mile, to 4 fathoms at three-quarters of a mile from the shore; but the whole extent from thence to within a few yards of the beach is one mass of rocks.

MOORINGS.—As no anchors could hold on a bottom of so objectionable a nature, moorings have been laid down, consisting of a 75-cwt anchor, placed in 3 fathoms at low water, springs, at about 800 yards north-westward of the jetty, with a 2-inch chain extending 50 fathoms from the anchor. To the end of this heavy cable is shackled a 1-inch chain, to which is attached a buoy.

Masters of vessels using these moorings, will have to haul up on the buoy chain until the large chain is above water; the best bower cable may then be shackled on to it, and veered according to circumstances. As these moorings are merely intended to afford security to vessels during westerly winds, it is hardly necessary to observe that the vessel making use of them, must have her small bower inshore, in the event of the wind coming off the land. Vessels are strictly forbidden to hang on to the small buoy chain, as the constant friction of that portion touching the ground so reduces the chain as to require its renewal annually.

Inner moorings.—There are moorings for small coasters, in 2 fathoms at low water, at 300 yards off Yankalilla jetty; they consist of two 25-cwt. anchors, each with 90 fathoms of $1\frac{1}{2}$ -inch chain, stretched North

and South, and having two $1\frac{1}{4}$ -inch buoy-chains, each 15 fathoms. Small vessels using these moorings may shackle on their cables to the buoys and veer towards the jetty. See Regulations, page 124.

TIDES.—It is high water at Yankalilla, full and change, at 3h. 30m.; rise at springs 6 feet.

SNAPPER POINT and BUOY.—From Carrickalinga the coast trends N.E. by E. 6 miles to the bight of Aldinga bay, and from thence N. by W. 4 miles to Snapper point, from which a reef extends more than half a mile in a W.N.W. direction, with its western edge trending in nearly a parallel direction with the coast for fully 2 miles to the southward: its northern edge extends East to about $1\frac{1}{2}$ cables' lengths northward of Snapper point, and then rounds into the bight of Willunga bay. This reef is composed of hard rocks, and has 10 fathoms near its outer extreme, on which there are 2 fathoms, with rocks, dry at low water, close to.

A large *red* pyramidal buoy, with a round top, has been placed in $10\frac{1}{2}$ fathoms water, near the edge of the reef stretching westward from Snapper point. This, like all other *red* buoys, should be left on the starboard hand when bound in. In the event of any accident occurring to the buoy, the reef off Snapper point may be cleared by keeping the inn—which is close to the beach on the north side of the jetty of Port Willunga—twice its own breadth open North of the end of the jetty. The buoy, which is placed inside this line, may be seen at the distance of 4 miles.

PORT WILLUNGA, which lies immediately on the north side of Snapper point, and may be recognized by its white cliffs, extends from that point nearly N.N.E. $\frac{1}{4}$ E. $1\frac{1}{4}$ miles to Blanche point and is about one-third of a mile deep. There are 6 to 3 fathoms in the bay, sheltered from southerly winds by the reef extending from Snapper point, which is the only danger near the anchorage; but winds from N.N.W., round by West, to S.W. blow directly into the bay, and when they increase to a gale, vessels must be well found in anchors and cables to ride out the heavy sea which then sets in.

DIRECTIONS.—Vessels approaching Port Willunga from the southward, should stand in for the white cliffs, guarding most carefully against the reef which extends from Snapper point, by keeping the *red* buoy on the starboard hand, or not hauling into the bay until the jetty bears E. by N. $\frac{1}{4}$ N., in line with a small house on the high ground inland: on this line they may stand in safely, and anchor.

From the Northward.—Vessels from the northward, will find no difficulty in approaching the coast after having passed the reefs off the Onkaparinga, 7 miles to the northward of Port Willunga.

ANCHORAGE.—The moorings which were laid down in 1855 have been removed; vessels will therefore have to depend on their own anchors.

The holding ground is good anywhere outside the 4-fathoms line off the jetty ; but the anchorage being exposed to all winds from N.W. round by West, to S.W., at times, a heavy sea rolls in, causing vessels at anchor to be uneasy, and, unless well found in ground tackle, rendering their position unsafe. It is therefore recommended on the approach of a north-west gale—which is indicated by a falling barometer and the wind freshening from the northward with a cloudy sky—that shelter should be sought in Eastern cove, Kangaroo island, where a vessel may anchor in perfect safety, according to her draught, and remain until more favourable weather enables her to return to Port Willunga.

The township of Willunga is situated at the western foot of the hills, at about 5 miles eastward of the port. Captain Stokes noticed in the neighbourhood slate quarries, where the “*cleavage*” and quality equalled any he had seen in Wales.

RESCUE from SHIPWRECK.—In the event of a vessel being stranded in or near Willunga bay, and the crew being in danger, assistance will, if possible, be rendered from the shore, as directed at page 54.

ONKAPARINGA HEAD and RIVER.—From Blanche point the coast trends N. $\frac{1}{2}$ W. about 5 miles to Onkaparinga head, a clifly projection with a ledge of sunken rocks extending from it. Onkaparinga river is a small stream, which flows into the sea through a bar of shifting sand, at about one-third of a mile to the northward of the head. From the mouth of the river a sandy beach, with sand hills behind it, trends N. by W. nearly a mile to Witton bluff.

PORT ONKAPARINGA is a safe and convenient little harbour formed by the protection which two narrow reefs afford the anchorage. It is situated in lat. $35^{\circ} 10' 20''$ S., long. $138^{\circ} 31'$ E., and may be easily recognized by Witton bluff, a bold reddish-coloured clifly projection, having a remarkable square detached rock at its base, lying nearly one third of a mile northward of the jetty.

The two breakwater reefs which protect the anchorage from the westward, lie in a direct line about N. by W. $\frac{1}{2}$ W. and S. by E. $\frac{1}{2}$ E., and nearly parallel with the coast, from the low-water mark of which they are distant from 200 to 350 yards; the greatest distance being between the northern reef and the shore, immediately to the southward of the jetty. The north and south reefs together extend from half a mile southward to nearly a quarter of a mile north-westward from the outer end of the jetty, and are separated by Middle channel, between 550 yards from the south extreme, and 630 yards from the north extreme of the reefs.

These reefs are only about 30 yards wide, and the highest parts do not exceed about 4 feet above low-water level ; they are consequently, during high springs, covered for a short time to the depth of 2 feet, but at other

times they distinctly show their extent and direction by appearing above water.

SOUTH CHANNEL, which should only be used by small vessels of light draught, is 100 yards wide, at its narrowest part, between the reef and a shoal spit projecting from the beach, nearly opposite the southern end of the reef. There are 9 to 10 feet water near the southern end of the reef, and 10 to 22 feet close along its inner edge.

MIDDLE CHANNEL is 130 yards wide, and has as much as 5 fathoms water in its centre, with the depth decreasing to 3 fathoms close to the points of the reefs on either side.

NORTH CHANNEL is 270 yards wide, with 18 feet water close to the reef, from whence the depth gradually decreases to 8 feet at about 50 yards from the beach.

SOUNDINGS.—There are 6 to 7 fathoms at about 50 yards from the back of the reefs, and in the harbour the soundings vary from 2 to 4 fathoms; the deepest water being close to the reefs, and in about the middle of the harbour.

MOORINGS.—One anchor of 18 cwt., is placed over the south reef at nearly 200 yards from its north extreme, having 60 fathoms of $1\frac{1}{2}$ -inch chain stretched in towards the beach. Another anchor of 18 cwt., is placed on the sandy beach at about E.N.E. 300 yards from the former, and has 30 fathoms of $1\frac{1}{2}$ -inch chain. The buoys to these moorings are attached by small buoy chains, only to be used for that purpose.

Northern Moorings.—One 18-cwt. anchor is laid over the north reef at about 200 yards from its northern extreme, and a 15-cwt. anchor is placed in a hole on the same reef, at about 200 yards from its southern extreme. Each anchor has 60 fathoms of $1\frac{1}{2}$ -inch chain stretched towards the beach, with a small chain attached to it, only intended to hold the buoy which belongs to it.

DIRECTIONS.—Vessels bound for Port Onkaparinga from the southward, should keep at least 1 mile off the coast until Onkaparinga head bears East, when she may steer for either of the entrance channels.

From the Northward.—A vessel intending to enter the port from the northward, should keep fully 1 mile off the coast until Witton bluff bears East, to avoid Horse-shoe shoal, which lies about half a mile from that headland.

South Channel.—A vessel under 10 feet draught, entering by this channel, should bring the *black* beacon, on the beach, in line with the upper *red* beacon, on the sand-hills, which will lead into the harbour, in not less than 10 feet at low water, springs. Having passed the southern point of the south reef keep close along its inner edge, to avoid the spit which projects from the beach on the opposite side.

To Moor.—It will not be necessary for a vessel to use her own anchors in this part of the harbour, as she may ride by the moorings; but it must be perfectly understood that these mooring chains are not attached to each other. A vessel must, therefore, moor to both chains, either head and stern, or be allowed to swing, by mooring her midway between the reef and the beach, for which there is ample room for any vessel not exceeding 100 feet in length.

Middle Channel.—The fairway of this channel is marked by two square *red* beacons, the more distant one being that on the sand-hills before noticed, and the other being near the beach; these kept in line, bearing about E.N.E., will lead into the harbour in 5 fathoms water. After passing the ends of the reefs the vessel may steer for either of the moorings, according to circumstances, but the northern should be preferred, as the water is smoother under the north reef, and she would be more convenient to the jetty.

To Moor.—To use either of the northern moorings it will be necessary to haul up on the small buoy chain until the vessel's best bower can be shackled on to the mooring chain; and an anchor must be laid out towards the beach, as strong land winds blow at night, during the prevalence of south-easterly winds. See Regulations, page 124.

North Channel.—A round *black* beacon on the jetty in line with the square *red* beacon on the sand-hills, already noticed, will lead into the harbour in 3 fathoms. If the wind be off the land, after passing the end of the north reef, stand in towards the beach, as close as the vessel's draught will permit, and drop the small bower; from this veer towards the mooring buoy, and pick up the large chain, as directed. Should the wind be from the westward it will, of course, be necessary to pick up the buoy first; and should it be blowing fresh, an anchor should be dropped under foot until the large chain is hove in, as no dependence can be placed on the small buoy chain, if the vessel is pitching to the short sea which comes over the reef at high water.

TIDES.—It is high water at Port Onkaparinga, full and change, at 4h.; rise, 6 feet.

REMARKS.—Mr. Douglas, from his experience of Port Onkaparinga, speaks most highly of its capabilities as a safe port for coasters not exceeding 200 tons, and of moderate draught. In westerly gales a short sea gets over the reefs at high water, but at other times of tide, when the reefs are uncovered, the water is quite smooth. The jetty and tramway will be found a great convenience in loading. The former, which is sheltered by the north reef, has 5 feet at ordinary low water, at its outer end, and the jetty being visible at a considerable distance from seaward,

is a good mark by which a stranger may pick up the entrance of the harbour.

THE COAST in this part of the gulf of St. Vincent consists of sand-hills, with occasional reddish-coloured cliffs of moderate elevation. The soundings are generally deep and regular; but some rocky points on this part of the coast have reefs projecting into deep water, which can be easily avoided by keeping a moderate distance off the land. As a rule, except bound into either of the out-ports, it will be prudent not to stand into less than 9 fathoms water.

From Witton bluff a somewhat rocky coast extends nearly N.N.E. 3 miles to Black cliff, and from thence 2 miles farther in the same direction, when it is succeeded by a sandy beach, trending N. $\frac{1}{2}$ W. $4\frac{1}{2}$ miles to Glenelg jetty, which is distinguished by a light and a flag-staff, and off which is Holdfast bay.

GLENELG JETTY LIGHT, in lat. $34^{\circ} 58' 33''$ S., long. $138^{\circ} 32' 42''$ E., is a *green* fixed light 29 feet high, and is visible in clear weather, at the distance of 6 miles.*

HOLDFAST BAY is an open roadstead off the town of Glenelg, having gradually decreasing soundings from 7 fathoms, at 2 miles, to 2 fathoms at a quarter of a mile off the jetty. The anchorage is in 5 or 6 fathoms, clay, at $1\frac{1}{2}$ miles from the shore, with the light or flag-staff in line with mount Lofty, bearing E. $\frac{1}{2}$ N. South-west gales cause a heavy sea in this roadstead; but as the holding ground is good, vessels may ride in perfect safety, if provided with good anchors and cables. Coasters may approach close to the end of the jetty; but care must be taken to avoid a shoal patch on an oyster bank, lying about a mile to the southward of the township.

CAUTION.—According to Admiralty chart, No. 2,389, there are only 12 feet water on the bank at $2\frac{1}{2}$ miles to the south-westward of Glenelg jetty, where the Admiralty plan, No. 1,752, shows 6 fathoms.

PORT ADELAIDE.—From Glenelg the sandy beach trends nearly N. by W. $\frac{1}{2}$ W. $7\frac{1}{2}$ miles to Malcom point, near the south extreme of Lefevre peninsula, and from thence 1 mile northward to the flag-staff and pilot and telegraph stations of Port Adelaide. There are 5 fathoms at 1 to $1\frac{1}{2}$ miles from the shore, between Black cliff and Malcolm point.

SEMAPHORE JETTY LIGHT.—At the end of the Semaphore jetty, which projects about a quarter of a mile from the pilot and telegraph stations, is a *red* light 27 feet above high water, and is visible from seaward, when bearing from N. $\frac{1}{2}$ W., round by East, to S.E. by S., at a distance of 6 miles. The light is obscured eastward of the latter bearing in order to keep vessels a mile westward of the sands at the outer bar of

* See Plan of Port Adelaide and Holdfast bay, No. 1752; scale, $m = 0.5$ of an inch; and Port Adelaide, enlarged; scale, $m = 1.5$ inches.

Port Alelaide creek, as it is in contemplation to remove the light-vessel, after the erection of a light-house on the south sand-head of the outer bar, of which due notice will be given.

This light is well adapted to show the steamers where to heave-to off the pilot station for the mail boats at night; it also affords a good cross-bearing for vessels anchoring to the northward, near the light-vessel, and is of great use at night, to point out the landing-place near the pilot and telegraph stations.

SIGNALS.—1st. All vessels arriving from over-sea ports, within 5 miles of the Semaphore station, on Lefevre peninsula, between daylight and dark shall hoist the following signals :—

1st. The national ensign at the peak or ensign staff.

2nd. The ship's number by commercial or Marryat's code.

3rd. The port from whence she arrives.

2nd. All vessels arriving from over-sea ports, off the Semaphore station, or near the entrance of Port Adelaide creek, during the night shall hoist at day-break the signal published in the first clause of these regulations.

3rd. All vessels arriving coastwise, within 5 miles of the Semaphore, between daylight and dark, shall hoist at the main, and keep flying for one hour, the signal showing her port of clearance or departure, by the code in the fifth clause of these regulations.

4th. All vessels having arrived coastwise, off the Semaphore, or near the entrance of Port Adelaide creek, during the night shall hoist at day-light, and keep flying for one hour, the signal prescribed in the third clause of these regulations.

5th. The following code of signals showing the names of ports or places in this province, refers to the third and fourth clauses of these regulations, and are to be hoisted by vessels arriving coastwise, as therein provided :—

COMMERCIAL. MARRYAT'S CODE.

V.W.G. or 1 Port Wakefield, or head of the gulf St. Vincent.

V.W.H. „ 2 Willunga, or Noarlunga.

V.W.J. „ 3 Yankalilla, Second valley, or Rapid bay.

V.W.K. „ 4 Kangaroo island.

V.W.L. „ 5 Port Victor, or harbour in Encounter bay.

V.W.M. „ 6 Port Caroline.

V.W.N. „ 7 Port Robe.

V.W.P. „ 8 Port MacDonnell.

V.W.Q. „ 9 Port Augusta.

V.W.R. „ 0 Port Wallaroo, or Tipara bay.

V.W.S. „ 10 Port Lincoln.

V.W.T. „ 12 Any other part of Spencer gulf.

W.B.C. „ 13 Fowler bay.

W.B.D. or 14 Streaky, or Venus bay.

W.B.F. ,, 15 Flinders island, or westward of Spencer gulf.

W.B.G. ,, 16 Yorke peninsula.

W.B.H. ,, 17 Any part of gulf of St. Vincent not enumerated.

W.B.J. ,, 18 Fishing or whaling voyage.

The flags are not to be less than one square yard, and pendants 3 by $4\frac{1}{2}$ feet. Commanders of vessels failing to comply with these regulations are liable to a penalty of not less than 5*l.* nor more than 30*l.*

WONGA SHOAL and BELL BUOY.—Wonga shoal, of which Semaphore spit forms the north-west extreme, consists of sand, and extends W.N.W. $1\frac{1}{2}$ miles from the end of the Semaphore jetty to the spit. A *red* bell buoy, shaped like a boat, with a staff and ball, has been placed, in 17 feet water, on the northern extremity of the shoal off the end of the jetty, and may be seen by day, at a distance of $2\frac{1}{2}$ miles. From the extremity of the spit the western edge of Wonga shoal trends nearly S.S.E.; and its northern edge curves round eastward and northward, forming a bight, in which there are 21 and 22 feet water. From the Bell buoy the water shoals gradually in a S.E. direction towards the shore.

DIRECTIONS.—The Bell buoy should be left to the southward and eastward; but small vessels may cross the shoal, in 12 feet water, to the southward of the buoy, and bringing the Semaphore light to bear E. by S. $\frac{1}{4}$ S., may anchor, according to draught of water, off the jetty. Large vessels should avoid crossing the shoal southward of the buoy, by not bringing the jetty light to bear to the eastward of S.E. by E. $\frac{1}{2}$ E., and not standing farther in than to have the light-vessel bearing N. $\frac{3}{4}$ W.

The LIGHT-VESSEL, which is moored in 5 fathoms, at 1 mile south-westward of the entrance bar of Port Adelaide, and N.N.W. $\frac{1}{4}$ W. $2\frac{3}{4}$ miles from the jetty light, is painted *red*, has two masts, and on the main is a *red* ball during the day. At night, a bright fixed light is shown on each mast, that on the main being 38 feet, and the other 29 feet above high water; the higher light being visible in clear weather, at the distance of 10 or 12 miles.

ANCHORAGE.—The best anchorage for large vessels is in 4 or 5 fathoms, anywhere northward of the Bell buoy, with the light-vessel bearing North to N.E. Vessels waiting for orders, will find it convenient to anchor tolerably close to the buoy; whilst those only waiting for tide to pass the bar, should anchor with the jetty light bearing S.E. and the light-vessel from N.N.E. to N.E. Small vessels may anchor inside the Bell buoy, with the light-vessel bearing from North to N. by W. $\frac{1}{2}$ W. and the jetty light from E. by S. to E.S.E.

The anchorage near the light-vessel is very good, and a ship may ride out any gale with a single anchor if a sufficient scope of chain, not less

than 70 fathoms, be given. It must, however, be remembered that when an anchor has once started in bad weather—it being likely to drag, owing to the sea-weed on the hard sandy bottom balling over the palm—it becomes imperative to let go the second anchor and veer enough chain to bring the ship up.

From the Semaphore jetty the sandy beach trends in a N. $\frac{1}{2}$ E. direction $4\frac{1}{4}$ miles to the north-west point of Lefevre peninsula, and is fronted by flats and shoal water, which at $2\frac{3}{4}$ miles northward of the jetty, project more than a mile from the shore; its extremity forms the eastern side of the entrance of Port Adelaide creek, and is marked by a *red* buoy and a beacon, the western side being distinguished by a *black* buoy.

PORT ADELAIDE CREEK, which separates Lefevre peninsula from Torrens island and the low land extending from the foot of the mount Lofty range towards the sea, and leads from the roadstead to the port, is about 1 to 2 cables wide, with sufficient depth of water for vessels of at least 17 feet draught to proceed up to the port; which, following the reaches of the creek, is distant 8 miles.

From the entrance over the Outer bar the channel trends 2 miles in a N.E. $\frac{1}{2}$ N. direction to within 2 cables' lengths of the north-west point of Lefevre peninsula, and from thence sweeps round eastward and south-eastward 1 mile to Snapper point, the north-east extreme of the peninsula.

NEW PORT.—TORRENS ISLAND.—From Snapper point the channel takes a southerly direction $2\frac{1}{2}$ miles to New Port or the North arm, a considerable branch of the creek, which, after extending about 2 miles to the eastward, turns northward and north-westward together about 4 miles, and communicates with the sea to the northward of Lefevre peninsula. This branch and Port Adelaide creek together, surround Torrens island, which is $3\frac{1}{4}$ miles long, North and South, nearly $1\frac{1}{2}$ miles broad, and has a smaller island close to the southward of it.

QUARANTINE GROUND.—Below the entrance of the North arm is a good stopping place for vessels meeting with foul winds. Vessels are here detained when placed in quarantine, or until their powder, if in any quantity, is discharged into lighters, to be taken to the magazines at the port.

From the entrance of the North arm the creek trends nearly S. by W. 2 miles to Port Adelaide, when, after turning about half a mile to the westward, it continues, in a reduced form, two or three miles farther to the southward; the direction of the creek from Snapper point to Port Adelaide being nearly parallel with the sea coast, from which its average distance is little more than a mile.

DIRECTIONS for PORT ADELAIDE.—Vessels entering the gulf of

St. Vincent may sight from a considerable distance, the high range of hills on the eastern side, extending from the southward to mount Lofty, at the northern extremity of some table land. This mount, which is the most elevated part of the range, is 2,200 feet above the level of the sea, and from cape Jervis bears N.N.E. $\frac{1}{4}$ E., distant 50 miles. For about 18 miles up the gulf the land is high and bold, but above that the shore becomes very low, with sand-hummocks upon it; and the same description of coast prevails to the head of the gulf.

After passing the high coast-land the water shoals some distance out, and in some places, within 10 miles of the light-vessel, there are 5 fathoms at 4 miles from the beach. Great attention must be paid to the soundings, especially at night, and in running up for the light-vessel, it would be most desirable to keep between 5 and 6 fathoms water, not going into less than 5 fathoms, as within that depth it shoals suddenly; and if in more than 6 fathoms, a vessel might pass to the westward of the light-vessel without seeing it. In these soundings the light-vessel will be made nearly ahead, and when she bears about N.E., distant 2 miles, it will be necessary to heave-to for a pilot, the mail agent, and the health officer, who will go off from the pilot and telegraph station. As the magnetic telegraph gives intelligence at Adelaide of all arrivals, commanders of vessels are requested to make their numbers on approaching the light-vessel.

A Steam Tug, if required, can be procured by hoisting the ensign at the fore.

A vessel waiting for water to cross the bar, should anchor in 5 or 6 fathoms, with a good scope of cable, and with the light-vessel bearing from N.N.E. to E.S.E. It is preferable to be at single anchor in this roadstead, as a vessel will ride more easily with one anchor than two, and a high tide, which would enable the vessel to cross the bar, might be lost by having two anchors to weigh, instead of one.

Should the light-vessel be made in the early part of the night, a vessel might anchor, in 6 fathoms, anywhere to the southward of it, or remain under way, being careful to keep to the southward of the light-vessel and as near to it as possible by the morning, to ensure the tide.

SIGNALS.—The following are the tidal signals made from the Semaphore, at the pilot station, in reference to the depth of water on the Inner bar, to which 4 feet may be added, to show that on the Outer bar :—

Black ball at South Yard-arm	-	-	-	12 feet.
„ „ North „	-	-	-	13 „
„ „ South Yard-arm and Mast-head	-	-	-	14 „
„ „ North „	-	-	-	15 „
Two balls at South Yard-arm	-	-	-	16 „
„ „ North „	-	-	-	17 „

Black ball at South Yard-arm and Quarter	-	18 feet.
„ „ North „ „	-	19 „
Black ball at each Yard-arm	- -	20 „
Two black balls at South Quarter	- -	21 „
„ „ North „ - -	- -	22 „
One black ball on North and South Quarter	-	23 „

For additional inches to any of the preceding signals Marryat's numerals will be hoisted, where best seen, every quarter of an hour on the flood. In the event of vessels of heavy draught proceeding down the creek, the signals will be made until the vessel anchors or passes the Inner bar.

High water.—A square *red* flag under the outer ball, exhibited at either yard-arm. When, as in the case of the 20-foot signal, balls are exhibited at both yard-arms, the *red* flag, high water signal, will be hoisted at the mast-head.

Low water.—A square *blue* flag, under the outer ball at either yard-arm.

The above signal will be kept flying from the time the tide appears stationary until the signal next after high or low water has been made.

Vessels in sight.—*Red* balls are shown at the mast-head for vessels in sight.

DIRECTIONS for PORT ADELAIDE CREEK.—In entering over the Outer bar, where there are said to be 14 feet at low water, keep a large *red* buoy, with a perch, and the *red* beacon on the starboard hand, or to the southward, and leave the *black* perch and can-buoys to the northward. Having passed the Outer bar, avoid the Gloucester bank, a shoal patch, on the outer edge of which is placed a *red* can-buoy in 10 feet. The vessel will then be in deep water, and may proceed boldly up the channel mid-way between the *black* beacons on the North sand and the *red* buoys on the South sand, until the *red* beacons are approached, which are to be kept on the starboard hand.*

On nearing the boat channel on the north side, beyond the last *black* beacon—the junction of which with the main channel is marked by a *black* nun-buoy—keep towards the North sand, to avoid the Bosphorus bank, on which is a *red* nun-buoy. This bank, on the shoalest part of

* These directions are principally extracted from Wellbank's Nautical Almanac for 1864, which gives only 10 feet on the bar, at low water, ordinary springs, nearly agreeing with the depth shown on the Admiralty Plan, No. 1752, corrected to 1863; but the Trinity House at Port Adelaide, gave notice that after the dredging operations in 1858 there were 14 feet on the Outer bar at low water, and 22 feet at high water springs. There is a difference between Wellbank's Nautical Almanac and the Admiralty Plan with respect to the colour of the buoys and beacons on the southern side of the channel, after entering;

which were only 3 feet at low water, extends 150 yards outside, and parallel with the line of the beacons on the South sand, and being very steep, it should be most carefully guarded against. Having passed this bank proceed in mid-channel, keeping the *red* beacons on the starboard side.

This portion of the channel, known as Lights passage, from its width, and having 18 feet at low water, springs, is a very good anchorage for vessels not having sufficient water to cross the Inner bar off Snapper point beyond the line of *red* beacons, or for those waiting for water or fine weather to pass the Outer bar, when outward bound. The best position for anchoring in Lights passage is between the first small *black* beacon on the North sand and the *red* beacons to the southward. In the event of remaining in this passage longer than a tide, it will be necessary to moor.

From Lights passage the water gradually shoals to 10 feet at low water, springs, on the Inner bar, which extends from the third *red* beacon below Snapper point nearly 1 mile to Mutton cove, a small creek on the west side of the channel. More caution is required in passing the Inner bar than any other part of the channel, as the bottom is composed of limestone crust in the passage, which is on the west side of the creek, and is contracted to one-third of the width of the stream, with (from former deepening operations) uneven soundings.

Vessels rounding Snapper point should keep well towards the western shore, as the whole of the eastern side of the channel, as high up as the North arm, has shoal flats extending at least 1 cable's length from the bank. All the small tributary creeks along the course of the main stream are assumed to throw out sand or mud-spits at various distances, in proportion to their size, which should be carefully avoided.

Having passed the Inner bar and Mutton cove, deep water will be found in mid-channel the remainder of the distance to the port, but above the North arm more care will be necessary in proceeding up the creek, as it becomes more narrow, although the water continues deep. On arriving below the harbour reach one of the harbour authorities will board the vessel, take charge, and point out the berth selected for her.

Having noticed the impediments which the Outer and Inner bars present to the navigation of Port Adelaide creek, it should be observed that the Harbour Trust has been actively engaged in deepening the navigable channel; and on the arrival from England of a powerful steam-dredge,

the Nautical Almanac describing them as *red*, whilst they are represented as *white* on the plan. Having, however, arrived off the Outer bar, a stranger will avail himself of the services of a pilot; and to a seaman familiar with the locality this discrepancy, or the omission of information relative to any recent alterations and improvements in the port, will be of little consequence.

fitted with appliances for removing the limestone crust—which is found at various depths throughout the course of the creek—immediate measures will be taken to deepen the water on the bars, regulating the relative depths on those obstacles and in the harbour above, so as to enable all vessels, after having crossed the bars at high water, springs, to lie afloat at low water, springs.

MOORINGS.—Heavy moorings have been laid down in the upper part of Port Adelaide, where vessels drawing 17 feet, may lie afloat at all times of tide ; and the bottom is even, should vessels find it requisite to moor.

A LIFE-BOAT of the same description as those used by the Royal National Life-boat Institution, is kept in reserve at Port Adelaide, to be sent to any part of the coast, by steamer, should information of a wreck be received in time to render the service of a lifeboat available.

TIDES.—It is high water at the Semaphore jetty, full and change, at 4h. 30m., and in the harbour of Port Adelaide at about 5h. 30m.; but the times are influenced by prevailing winds. In summer, ordinary springs rise about 8 feet, but during a westerly gale, a 12 feet rise has been experienced. As the tidal wave proceeds along the coast from the westward, between Cape Leeuwin and Encounter bay, the tides are higher during strong westerly gales, and are lowered, or retarded by easterly winds, and are very sensibly felt in the gulf of St. Vincent and in Port Adelaide.

At neaps the tide ebbs and flows during the entire day, in fine weather, and the rise will not exceed 2 feet. Sometimes, however, a higher tide is experienced at the neaps during a westerly gale, than at the springs in fine weather, with southerly and easterly winds ; but owing to the westerly gales outside, though not blowing home, or into the gulf of St. Vincent, the tides are sometimes, during fine weather, at Port Adelaide very materially affected by causes beyond and outside Investigator strait. Another peculiarity exists in Port Adelaide, as during the winter months, or between April and October, the highest tides take place in the evening, whilst between October and April the contrary is experienced.

The Barometer generally gives due notice of any irregularity in the tides, although a strong westerly gale and the consequent high tide are sometimes preceded by a remarkably low barometer.

The tides are so much affected by the prevailing winds and weather that a tide table would be almost useless, and certain in many cases to mislead, as, from causes which may exist outside and remote from the gulf, the times, as well as the rise and fall of tides, are occasionally so much affected that even persons having long experience are sometimes at fault.

PILOTS.—There are two classes of pilots at Port Adelaide ; the first

class being qualified to pilot a vessel of any tonnage or draught, and the second to pilot vessels not drawing more than 14 feet. The former fly the regular pilot flag, and the latter the same flag, with a blue ball 1 foot in diameter in the centre of the flag. When first and second-class pilots are in one boat at the same time the first-class flag is exhibited.

The commander of any vessel arriving from parts beyond the sea, intending to enter any port in the Province of South Australia, shall receive on board such vessel, and give her in charge, to the first qualified pilot who shall offer to conduct her into port, the pilot producing his licence if required; and no master of such vessel shall proceed to sea from within the Outer bar of Port Adelaide without a pilot, unless the master or mate has a certificate of exemption for the ports of this colony. The master of any vessel having such certificate of exemption from the Marine Board, and not having a pilot, shall, when within 5 miles of all pilot stations, keep a *white* flag of not less than 2 square yards, flying at the main until she gets into port.

If a vessel of more than 14 feet draught be in charge of a second-class pilot through no one of the first class having offered himself, the pilot signal is to be kept flying until the second-class pilot delivers over the charge of the vessel to the first-class pilot, who shall offer himself before the vessel arrives at her destination; and the second-class pilot shall be paid pilotage in proportion to the distance he has piloted the vessel.

The pilot in charge of any vessel in pilot waters, when approaching the harbour, is required to use the lead for sounding, especially at night, or in thick weather by day, when approaching Port Adelaide bars, or when in any locality where the sands or shoals are likely to shift or alter.

Each pilot shall put on board every foreign vessel of which he takes charge, a copy of the harbour regulations and the byelaws from which these regulations are extracted.

Pilotage.—Sea pilot dues for every vessel entering or leaving Port Adelaide - - - - - £3 5 0

For every foot or part of a foot more than 9 feet

draught - - - - - 0 15 0

Harbour pilot dues for the removal of vessels from one place of anchorage to another within the port:—

For every vessel under 100 tons - - - £0 10 0

above 100 „, and under 200 tons 0 15 0

„ 200 „ „ 300 „ 1 5 0

„ 300 „ „ 400 „ 1 15 0

„ 400 „ „ 500 „ 2 5 0

„ 500 „ and upwards „ 3 0 0

Including mooring and unmooring.

Each removal to be paid for separately, when the distance of a vessel so removed exceeds her own length, or when a vessel is moved from the limits of one wharf to another ; but the first removal to be charged whatever the distance may be. Vessels registered in the Province under 50 tons, or while employed in the coasting trade, exempted.

The dues for piloting a vessel from sea to any part of Port Adelaide creek below the outer limit of the Inner bar, or from thence to a fair berth off the light-vessel, shall be half the rates as calculated on a vessel's draught, and now levied on vessels proceeding from the light-vessel anchorage to the wharves at Port Adelaide.

The charge for piloting a vessel to the anchorage off the light-vessel shall be

For any distance not exceeding 3 miles	-	-	£3	0	0
And for any distance exceeding 3 miles	-	-	4	0	0

Exemption from Pilotage.—Any master or mate may, after giving notice, and consenting to pay fees, apply to the Marine Board for examination as to his capacity to pilot the vessel of which he is master or mate, and if found competent, will be allowed a certificate of exemption.

Any master of a coaster above 100 tons, or any regular trader between Port Adelaide and any of the Australian colonies, including New Zealand, may be granted a certificate of exemption on having made three voyages in command, or five as mate, of any vessel to Port Adelaide or its dependencies, after passing an examination before the Marine Board satisfactorily, and paying the sum of 10*l*. Certificate not transferable.

SANITARY REGULATIONS.—The commander of every vessel arriving at Port Adelaide shall allow no person to leave the vessel, and no goods, personal luggage, or any other thing to be sent from the vessel, the mails only excepted, till he shall have obtained permission to that effect from the health officer or one of his assistants. And no one shall be allowed to go on board except the health officer, his assistants, and the pilot, who takes charge, until permission is given by the health officer or his assistants.

No pilot shall take any vessel farther than the North arm, till the health officer or one of his assistants has boarded, and given directions how far the vessel may proceed.

GUNPOWDER REGULATIONS.—All vessels arriving in the ports or harbours of South Australia, having gunpowder on board, shall hoist the union jack at the main ; and no vessel proceeding up the creek to Port Adelaide shall pass Lipson reach, North arm, without landing all gunpowder exceeding 30 lbs. All gunpowder exceeding 30 lbs. shall be landed at the powder magazines.

Gunpowder shall only be landed during such hours as are fixed by the Marine Board; and all boats used in the conveyance of gunpowder shall be properly housed over and covered with tarpaulins. No iron shall be used in the construction of the barrels or packages, and no package shall contain more than 100 lbs. weight of powder.

CUSTOM HOUSE.—The master of every vessel arriving from parts beyond the sea, at any port within the Colony of South Australia, whether laden or in ballast, shall within 48 hours after such arrival, and before bulk be broken, deliver at the Custom house of such port a report of the vessel, &c.

And masters of vessels shall give 24 hours' notice before leaving any port in the Province, to the postmaster; and when the vessel's departure is postponed from any cause, except wind and weather, it shall be notified to the postmaster. It is also provided that the vessel's ensign shall be hoisted 24 hours before her departure; and a true list of the passengers and crew shall be delivered to the officer of the Marine Board before the vessel leaves any port or harbour of the Province.

LANDING-PLACES.—No goods, except passengers' luggage of a portable nature, shall be landed at, or shipped from, the public steps or landing-places; and no goods shall be landed at or shipped from the wharf frontage of the North parade, without a written permission from the Harbour Master.

STEAM TUGS' CHARGES.—From the light-vessel anchorage to Lights passage, below Snapper point, the charge for towing a vessel not exceeding 200 tons is 3*l.*; and for every additional ton 2*d.*

From Lights passage to North arm, for vessels not exceeding 200 tons, 3*l.*; and for every additional ton 2*d.*

From the North arm to the port, for vessels not exceeding 200 tons, 2*l.*; and for every additional ton 2*d.*

LIGHT DUES charged in Port Adelaide on vessels to and from Great Britain and foreign ports, in or out, 3*d.* per ton; and to and from any Australian colony, in or out, 1½*d.* per ton.

Coastwise—the charge on a vessel of 30 to 50 tons is 10*s.*, and of 50 to 100 tons 1*l.* per quarter, in advance; and above 100 tons 1*d.* per ton, in or out.

Vessels entering Port Adelaide to pay light dues in accordance with the scale applicable to the first port of departure; and on leaving, according to the scale applicable to the last port of discharge.

SURVEYOR'S FEES.—The fee a licensed surveyor may

demand for surveying a vessel's hatches and cargo,

including attendance as required by the master, shall £ s. d.

not exceed - - - - - 3 3 0

14561.

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For each set of certificates, as required by consignees or merchants, in triplicate	-	-	-	-	£	s.	d.
					0	10	6
Survey of a vessel for insurance, including report, as required by underwriters or agents	-	-	-	-	2	2	0
Survey of a vessel for repairs, including attendance during the process of such repairs, and drawing up report on the repairs being completed	-	-	-	-	4	4	0

The RECEIVER of WRECKS appears to have supreme control over a wrecked vessel, and may give the master such directions as he thinks advisable; the master would then be bound to order his crew in accordance with such instructions.

Fees.—For the first six days in attendance on a vessel, besides actual cost of conveyance to and from the scene of the wreck of such vessel, *2l. 2s. per diem.*; and after the first six days, *1l. 1s. per diem.*

The SHIPPING OFFICE is conducted under the Marine Board, which appoints shipping-masters, and persons to act as such, at the out-ports of the Province, who are directed to keep registers of the names and characters of seamen, to facilitate engaging and discharging them.

There shall be a regular agreement between the master of a vessel and his crew before he shall leave any port in the Province, such agreement being in duplicate, signed in the shipping-master's presence, after the seaman declares that he understands the same; and all seamen shall receive their wages and be discharged in the shipping-master's presence.

Fees for the engagement or discharge of the crews of vessels in the foreign trade of—

					£	s.	d.
50 to 60 tons	-	-	-	-	0	15	0
60 to 100 „	-	-	-	-	1	0	0
100 to 200 „	-	-	-	-	1	10	0
200 to 300 „	-	-	-	-	1	15	0
300 to 400 „	-	-	-	-	2	0	0

and so on, increasing *5s.* for each succeeding 100 tons register; and for the discharge of seamen separately, *5s.* There is also a fee deducted from each person of a crew engaged or discharged, according to rank, varying from *7s. 6d.* to *3s.* For the Colonial trade the above fees are reduced about one-half; the fee deducted from each person of a crew engaged or discharged in the Colonial trade varies from *4s. 6d.* to *2s. 6d.*, according to rank.

REGULATIONS TO AVOID COLLISION.—When steamers or other vessels are meeting each other, the helms of both vessels should be put to port, so as to pass each other on the port side.

Steam vessels, when navigating any narrow channel, shall, when safe

and practicable, keep to that side of the fairway, or mid-channel, which lies on the starboard side of such steam-vessel.

If any collision shall ensue from a breach of the above rules, the owner shall not be entitled to recover recompense for damage sustained, unless it be proved that the circumstances of the case made a departure from the rules necessary.

ADELAIDE, the metropolis of the Province of South Australia, lies N.E. 5 miles from Glenelg, and S.E. 6 miles from the port ; it is situated on the river Torrens, in the centre of a rich plain, extending from the foot of mount Lofty to the sea. The river is an insignificant stream, diminished to a series of pools, in the dry season.

PORT GAWLER, N.W. 5 miles from the north extreme of Lefevre peninsula, is the mouth of a small river flowing about S.W. by W. 17 miles from the township of Gawler. The space between the entrance of Port Adelaide creek and Port Gawler is mostly occupied by shoals, with narrow channels between them, and separated from the main-land to the north-eastward, by a channel half a mile wide, communicating to the south-eastward, with the creek on the east side of Torrens island.

SANDY POINT.—From Port Gawler a low sandy shore, with rising land behind it, curves north-westward 19 miles, and from thence trends N. $\frac{3}{4}$ W. 15 miles to Sandy point, the east side of the entrance of Port Wakefield. Bald hill, N.E. $\frac{3}{4}$ E. $1\frac{1}{4}$ miles from Sandy point, is the summit of some grassy land descending half a mile from it towards the point, with a small red cliff 50 feet high, to the westward of the hill.

Between Port Gawler and Sandy point the coast is fronted by an extensive flat, which is steep-to, with 1 to 3 fathoms water on it. The outer edge from $2\frac{1}{2}$ miles off Port Gawler curves 20 miles in nearly a N.W. by W. $\frac{3}{4}$ W. direction to Long spit, and gradually extends from $2\frac{1}{2}$ to 8 miles from the land, which, being very low, is scarcely discernible.

LONG SPIT and BUOY.—The western extreme of Long spit is marked by a large *red* pyramidal buoy, surmounted by a triangular head, moored in 19 feet water, with mount Lofty bearing S.E. by E., and the western summit of Hummock mounts, at the head of the gulf, N. $\frac{3}{4}$ W. The coast cannot be seen from a small vessel when outside the buoy, unless there be much refraction.

The patch on which the buoy is placed, is probably detached from the main shoal, there having been noticed at about $1\frac{1}{2}$ miles to the northward of the buoy, a swatchway, or channel, with deeper water. But until this portion of the gulf is better surveyed, these banks and the approach to Port Wakefield to the northward, cannot be accurately described.

From Long Spit buoy the imperfectly known outer edge of the flat

curves irregularly, in a North direction to Bald Hill spit, at 2 miles off Sandy point. As the edge of this flat is steep-to, it must be approached with great care.

THISTLE ROCK, South $6\frac{1}{2}$ miles from Sandy point, and at about 2 miles from the shore, has recently been removed by blasting, to about 3 feet from the bottom, there being now 8 feet on its remaining portion. This rock, which has been quite out of the track of large vessels, could always be avoided by not getting into less than 3 fathoms. Other small rocks have been reported by coasters to lie near Thistle rock.

BALD HILL SPIT and BUOY.—Bald Hill spit, which is formed of hard white sand, with flat patches of limestone, dry at low-water springs, extends W.S.W. $1\frac{3}{4}$ miles from Sandy point, and is marked by a large *red* nun-buoy, moored in 17 feet water, at W. by S. $2\frac{1}{4}$ miles from Sandy point, with Wakefield mill bearing N. by E. $\frac{1}{2}$ E. and the house at Clinton N.W. by W. $\frac{1}{4}$ W.: between the spit and the buoy is a narrow $2\frac{1}{2}$ -fathoms channel. There are $3\frac{1}{2}$ fathoms at a cable's length, and 5 fathoms at one-third of a mile West of the buoy; but to the southward of it the water is only deep enough for small vessels of light draught.

ASPECT.—From mount Gawler, which bears N. by E., distant $12\frac{1}{2}$ miles from mount Lofty, a range of moderately high and well-wooded hills, decreasing in elevation to the north-westward, extends 64 miles in a north-westerly direction to the hill already noticed as being visible from Spencer gulf.

The WEST COAST of the gulf of St. Vincent from Giles point, Macdonnell sound, extends nearly North 33 miles to point Kooley Wurta, from which a ledge of rocks projects about a mile to the north-eastward. At nearly midway between the two points the coast forms a broad projection, from which Middle shoal dries out nearly 3 miles, in the form of a narrow spit. South and North shoals, each distant 6 miles from Middle shoal, are similar spits, which dry out above 3 miles from the coast.

ORONTES BANK, of which the south-east point lies N.N.E. $\frac{1}{2}$ E. 19 miles from Troubridge light, is an extensive shoal, having $1\frac{1}{2}$ to 3 feet water on it, and stretching 11 miles from the coast, between South shoal and point Kooley Wurta. From the south-east point of this bank its southern edge trends W. $\frac{3}{4}$ N. 5 miles to an opening between the bank and the shoal water which borders the main-land. This opening, which is $3\frac{1}{2}$ miles wide between Orontes bank and South shoal spit, trends to the northward and north-westward round Middle shoal spit, and has 5 to 4 fathoms water. The outer edge of the bank, after extending 10 miles to the northward from its south-east extreme, curves in a N.W. by W. direction about 12 miles, to 4 miles southward of point Kooley Wurta.

The coast from point Kooley Wurta extends North 7 mile to Munta Wurta creek, or rivulet, and from thence N.E. $\frac{1}{2}$ N. nearly 15 miles to Mangrove point, which forms the west side of the entrance of Port Wakefield, and lies W. $\frac{1}{2}$ S. 6 miles from Sandy point. This coast, which is in some places cliffy, is fronted by shoal water, that at about 10 miles south-westward of Mangrove point extends $4\frac{1}{2}$ miles from the land, from whence the outer edge closes the shore to about 1 mile off the point, from which a sand-flat dries two-thirds of a mile to the eastward and $1\frac{1}{2}$ miles to the northward.

ASPECT.—With the exception of mount Rat, N. $\frac{3}{4}$ W. 33 miles from Troubridge hill, and mount Barbara, N.N.E. $\frac{3}{4}$ E. 18 miles from mount Rat, there appear to be no particular hills worthy of notice on Yorke peninsula ; but from the Copper Mine, near the shore south-eastward of mount Rat, a level grassy coast range, thickly wooded, extends about 40 miles northward to Hummock mounts, the summit of which being 1064 feet high, is a good mark for vessels running up the gulf.

THE FAIRWAY in the gulf of St. Vincent is 20 miles wide between Port Adelaide and Orontes bank ; but from the north-east extreme of the bank to the entrance of Port Wakefield the channel, which turns to the north-westward and northward, decreases from 10 to $1\frac{1}{2}$ miles in width.

SOUNDINGS.—For about 16 miles westward from the entrance of Port Adelaide the soundings increase from 6 to 12 and 14 fathoms ; but within about 4 miles of the eastern edge of Orontes bank they are very irregular, varying from 16 to 4 fathoms. From Orontes bank to about 4 miles southward of Mangrove point the soundings are more regular, decreasing from 14 and 15 to 5 fathoms. From Orontes bank to the head of the gulf the water shoals so gradually, upon a bottom so perfectly even, that the effect elsewhere produced upon the water by any gale, is lost before the waves have reached the vicinity of Port Wakefield, enabling vessels to ride in perfect safety, at a distance from the mouth of the river according to their draught. The bottom is composed of tenacious mud.

The TIDE STREAMS to the N.W. of Port Adelaide light-vessel are strong. The flood sets over the Long spit N.W., and the ebb S.E., attaining at springs, a velocity of 2 knots.

PORT WAKEFIELD, which forms the head of the gulf of St. Vincent, extends from its entrance North 8 miles, and is 6 miles wide. Its shores are low and lined with mangroves ; that near Sandy point, and the northern portion of the western shore, being swampy and covered at half-tide. Although so spacious, Port Wakefield is so much occupied by sand and mud-flats, as only to leave a comparatively small space with more than 3 fathoms, which does not extend 2 miles within the entrance ; the

anchorage recommended being in 4 fathoms, at about N. $\frac{3}{4}$ W. $1\frac{3}{4}$ miles from Bald Hill Spit buoy, with Wakefield mill bearing nearly N.N.E. $\frac{1}{2}$ E., and the house at Clinton W. by N. to W.N.W. There will be room to swing in this berth, but not sufficient space to beat out of it without going into 18 feet water; and there is not more than 12 feet at springs, above Clinton.

WAKEFIELD CREEK and TOWNSHIP.—Wakefield creek flows from the East, and by the township, into the port, at about 5 miles to the northward of Sandy point. The entrance of the creek is very shallow, and is fronted by a flat more than a mile in extent, uncovered at low water, springs; but at a rise of 6 or 7 feet above low water, springs, a loaded barge can cross the bar.*

WILLS CREEK.—CLINTON JETTY.—Between Mangrove point and Clinton jetty, at nearly 3 miles to the northward of the point, the western shore of Port Wakefield forms a bight, having some red cliffs to the south-westward of the jetty. This bight is filled by a shoal flat, intersected by Wills creek, a narrow 5-foot channel, which from its mouth, at $1\frac{1}{2}$ miles N. by E. $\frac{1}{2}$ E. of Mangrove point, trends S.S.W. $\frac{1}{2}$ W. $2\frac{1}{4}$ miles into an opening in the mangroves on the west side of the point.

CLINTON has only one house, which being whitewashed, shows out well against the dark scrub behind it. There is a jetty 718 feet long, with a tramway; but it is not now used, as the flat dries a long way off.

ROSO ROCK, nearly N.E. $\frac{1}{2}$ N. 4 miles from Clinton jetty, has only 3 feet water on it, with 6 feet for a considerable distance round it.

DIRECTIONS.—From the light-vessel off the Outer bar of Port Adelaide steer nearly N.W. by W. $\frac{1}{4}$ W., making due allowance for tide stream and leeway, for 23 miles, to about 2 miles S.W. of Long Spit buoy; then steer N.N.W. $\frac{1}{2}$ W. 5 miles till the western summit of Hummock mounts is seen bearing nearly North, when alter course to North for about 14 miles; the vessel will then be in 5 fathoms, near the bank which borders the shore at about 4 miles to the southward of Mangrove point, with Bald hill bearing N.E. by E.

As from this position to the entrance of Port Wakefield, there is a great discrepancy between the late Colonial sailing directions and the chart, the latter showing but one sounding, and that only 6 feet water, in a space of 3 miles, the master of a vessel, well acquainted with this locality, must use his own judgment; and a stranger is recommended not to proceed farther without a pilot to conduct him to the anchorage in Port Wakefield.

Working.—In beating up the gulf from Port Adelaide light-vessel

* The deepening operations about to be carried on by the Government, will considerably increase the depth of water on the flat.

against head winds, make the first board to the westward for about 16 miles, taking care not to go into less than 8 fathoms, so as to avoid Orontes bank. Then endeavour to work between Orontes bank and the flats which front the eastern shore; and in approaching Long spit care must be taken to sight the buoy, in order to insure being to the northward of Orontes bank.

Being off Long Spit buoy, and consequently to the northward of Orontes bank, the western shore may be safely approached, making long boards from 5 fathoms outside Long spit, on the east side, to 1 or 2 miles off the western shore.

Should a vessel anchor in such shoal water in Port Wakefield as to touch the ground, no injury is likely to occur, if care be taken to keep the vessel clear of her anchor, as the bottom is generally composed of sand and mud, and there is no sea.

CAUTION.—In thick weather, or in the middle of a summer day, when the sun is ahead, and objects are much affected by refraction, the lead should be carefully attended to in going either up or down the gulf. By maintaining a depth of 5 fathoms, the edge of the Long spit may be avoided, and the buoy sighted.

Exports.—Supplies.—The rising township of Wakefield exports large quantities of grain and wool: firewood is plentiful; but water is very scarce in summer; vessels are therefore recommended to get a sufficient supply at Adelaide, if touching there on their way up the gulf.

TIDES.—It is high water in Port Wakefield, full and change, at 4 h. 27 m.; springs rise 11 feet. But the tides are very irregular, and much affected by prevailing winds; with strong westerly winds the rise is much greater, whilst the fall is considerably diminished. In westerly winds, there will often be a higher tide at neaps than at springs, with fine weather and south-east winds, when the tides are at the lowest, and the rise at springs is much reduced. At neaps, in fine weather, the rise is almost imperceptible, the time of high water being very irregular. Off Bald Hill Spit buoy the flood stream sets N. by W. and the ebb S.S.E. 1 to 2 knots at springs.

THE WINDS during fine summer weather are, from sunrise to about 8 a.m., generally from East to E.S.E. In hot weather the wind in the morning may be from N.E., generally falling calm towards 8 a.m., the sea breeze setting in at about 11; it freshens towards 5, and gradually moderates till sunset, when it veers round to the S.E., and dies away towards night.

The Barometer falls rapidly with northerly winds, both in winter and summer, and generally precedes a change of weather from the westward. In summer, the change often occurs suddenly from the southward, when it blows hard. In winter the strongest winds are from the westward.

DIRECTIONS.—DOWN the GULF of ST. VINCENT.—In leaving Port Wakefield it is advisable not to start until morning, when, the land wind being generally easterly, an offing may be easily obtained without beating out. There is no difficulty in proceeding down the gulf if due attention be paid to the lead, and care taken to avoid the shoals on either side. From Port Adelaide light-vessel steer S.S.W. until to the southward of Troubridge shoals, which course will keep the land on the east side of the gulf in sight, and the vessel out of the influence of the tide stream, which sets through Backstairs passage. But on no account steer a course under the impression that it will weather the shoals, until far enough to the southward to shape a course down Investigator strait, as it would expose a vessel's broadside to the rapid tide stream which sets directly upon Troubridge shoals.

In working down the gulf, never exceed a distance of 10 miles from the eastern shore, as the opposite side is shallow ; and be careful when standing in to keep the lead going, as it is shoal a considerable distance off, until as far down as to be abreast of the high land. In some places to the northward of Holdfast bay there are not more than 5 fathoms, at a distance of 4 miles from the beach, and the water shallows very quickly within that depth ; but where the high land fronts the sea the shore is steep, with the exception of a reef lying a mile off shore at about 3 miles to the southward of Holdfast bay.

In moderate weather, by closing the shore at sunset, the wind, which usually blows from the land about that time, will be favourable for proceeding down the coast, being careful not to stand too far off shore until to the southward of Troubridge shoals and well down with cape Jervis. Vessels bound to the eastward, should keep as close to the cape as wind and weather will permit, to avoid being set to the westward by the flood stream from Backstairs passage.

When working westward through Investigator strait, care must be taken not to stretch too far into Nepean bay, in order to avoid the long sand spit, which extends south-eastward from point Marsden. This danger should not be approached in less than 4 fathoms, and it may be easily avoided by timely soundings and a good look-out from aloft, from whence the shoal may be distinctly seen, as it dries to a considerable extent at low water. Vessels meeting with a strong westerly wind may anchor on the east side of point Marsden, as noticed at page 147.

TIDES.—There is not much tide in the gulf of St. Vincent, but its rise depends greatly on the winds; those from the south-west quarter producing high tides, while strong north and north-east winds have a contrary effect. It is high water about 7 hours after the moon's meridian passage, and the average rise 4 to 6 feet.

WINDS and REVOLVING STORMS.—In steady weather, the wind in the gulf of St. Vincent generally commences at about 8 a.m. from South or S.W., increasing in strength until about 4 p.m., when it gradually subsides, and is succeeded by a land wind from the eastern shore; but seldom or ever is any land wind experienced from the western shore. At this place Captain William Geves, of the ship *Albatross*, says he found the revolving theory of the winds (for the southern hemisphere) strictly confirmed. A gale may commence at N.W., but it will most assuredly blow itself out, veering gradually to S.W., South, and S.E. The strongest winds always commence from the south-westward.

SOUTH COAST.—From cape Jervis the south coast, which is of a bold and rocky aspect, intersected by ravines, and covered to seaward by scrub, trends E. by S. 6 miles to the south extremity of cape Jervis promontory, and from thence nearly E. by N. $\frac{1}{4}$ N. 16 miles, when the hills fall back from the sea, the shore becomes low, with hummocks of sand upon it, and stretches N.E. $\frac{1}{4}$ E. 6 miles to Rosetta head, a high remarkable peaked hill forming the west point of Encounter bay and the south-west point of Rosetta harbour.

ENCOUNTER BAY extends about East 20 miles from Rosetta head, and is 5 miles deep, with soundings in 19 to 24 fathoms between 5 and 15 miles from the shore, on a bottom of sand, in some places mixed with shells; but the bay is too much exposed to the southward to afford safe anchorage, except in Rosetta and Victor harbours and Port Elliot, in the north-west part of the bay.

ROSETTA HARBOUR.—This little cove, which is only available for small vessels, is open to all winds from S.S.W to East; but good moorings have been laid down for the safety and convenience of vessels frequenting the bay, and there is a competent licensed pilot stationed here.

SEAL ROCK, about E.N.E., 2 miles from Rosetta head, is a mass of granite boulders about 50 feet high; a reef, on which the sea breaks heavily, extends nearly 1 cable's length eastward from the rock.

There are no outlying dangers beyond a line from Rosetta head to Seal rock, and the depths outside that line are generally from 9 to 10 fathoms, increasing rapidly towards the offing. But in the bay, between Rosetta head and Seal rock, the bottom towards the shore is foul, and the sea in bad weather, occasionally breaks in 5 fathoms.

GRANITE ISLE, three-quarters of a mile to the north-westward of Seal rock, is bare-topped, about half a mile long, East and West, and a quarter of a mile broad. The summit of the isle, which is nearly level, is 140 feet high, the most elevated part being towards the west end. There

is a landing-place on the north side, and a rocky causeway connects the isle with the main-land at low water, springs; but no person should attempt to cross, except at very low tides and in day-light.

The passage between Seal rock and Granite isle is free from dangers, the depth being from 5 to 7 fathoms; but in bad weather, or when the ocean swell rolls in heavily, the sea in some places, breaks with great violence. This passage is therefore not recommended, except in fine weather and with smooth water.

To the westward of Granite isle there is a good anchorage, named Davenport, available for moderate-sized vessels. It is however, not recommended, as the approach to the westward of Granite isle is indifferent, and Victor harbour to the eastward, renders the use of Davenport unnecessary.

VICTOR HARBOUR, about N.E. 3 miles from Rosetta head, is situated in the bight between Granite isle and Port Elliot, to the north-eastward. The water shoals gradually towards the main-land, but more rapidly towards the rocky shore of Granite isle and the reef which connects it with the main-land. The anchorage in Victor harbour is not particularly good, as the bottom has many rocky patches; but to obviate this objection, heavy moorings have been laid down for three vessels, in depths from $9\frac{1}{2}$ feet, inshore, to $19\frac{1}{2}$ feet seaward.

The **MOORINGS** consist of single-armed anchors, of 75 cwt. each, with 3-inch mooring chains and bridles of $2\frac{1}{4}$ -inch chain. The inshore berth is in $9\frac{1}{2}$ feet at low water, the middle berth in $14\frac{1}{2}$ feet, and the outer berth in $19\frac{1}{2}$ feet.

Should a vessel require a greater depth of water than that at the outer mooring, she should anchor and moor in 22 feet at low water, with an old mill on the coast to the westward, just open of the north point of Granite isle, and Seal rock its own length open to the eastward of a projection of the main-land, named point Douglas.

DIRECTIONS.—Vessels from the southward, bound to Victor harbour, are liable during the prevalence of strong south-westerly winds, to be set to the eastward of their estimated positions. It is therefore desirable to steer direct for Rosetta head; and at all times, during day or night, it is preferable to make this headland, as the coast near it is bold and free from outlying dangers.

As the swell is generally very heavy on this part of the coast, care should be taken against getting too close in with the land about Rosetta head in moderate or light winds, as the wind sometimes suddenly falls light when the high land is approached.

Having closed with the land so as to make out Seal rock, a vessel may steer so as to pass half a mile to the southward of the rock, and haul round under its lee, or north-east side, as closely as wind and sea will permit.

From thence a N.W. course may be kept towards the harbour, within which the mooring buoys will be seen, and the vessel may proceed to moor, as directed at page 124, observing that the *red* buoy inshore marks the position of the crown of the inshore anchor.

If the Seal rock can be distinguished at night, there is no danger in standing for Victor harbour, keeping the lead going, and not steering to the westward of N.W., if the rock be rounded at some distance, or N.W. by N. if passed close to. But strangers having no pilot on board, should be very cautious in approaching the coast to the eastward of Rosetta head during the night, as it is extremely difficult to make out the Seal rock against the dark coast-line of the main-land. A pilot, however, can be obtained on hoisting the usual signal when approaching the coast.

PILOTS.—There is a Government pilot at Port Elliot, to the north-eastward, besides the licensed pilot at Rosetta harbour; but the latter is more conveniently stationed. Should he, however, not come off, the officer at Port Elliot will do so, and the vessel should be kept to the north-eastward of Seal rock to meet him; but with ordinary care and judgment no commander of a vessel need hesitate to take his vessel into Victor harbour without the services of a pilot during the day, or in a clear moonlight night.

The Pilotage Fees for Rosetta and Victor harbours and Port Elliot are :—

	£	s.	d.
For every vessel of 30 tons, in or out - - - - -	1	10	0
„ „ above 30 tons, and not exceeding 9 feet draught	2	0	0
For every foot or part of a foot above 9 feet draught, in or out	0	10	0

TIDES.—It is high water in Victor harbour, full and change, at 1 h.; rise, 6 feet.

PORT ELLIOT, N.E. $5\frac{1}{4}$ miles from Rosetta head, is the easternmost anchorage in Encounter bay. It is a small bight on the east side of Freeman Nob, which is distinguished by a *white* obelisk, visible at a distance of 10 miles. There is also a flag-staff, on which Marryat's signals are made to vessels in the offing. At nearly 100 yards to the northward of Freeman Nob a breakwater projects about 140 yards from the shore, and forms the south-west entrance point of the port, which from thence only extends N.E. a quarter of a mile to Commodore point, and is barely 2 cables deep.*

The anchorage is sheltered from the southward by Lipson isle, the south-west extreme of which lies S.E. 2 cables' lengths from the end of the breakwater, and the north-east extreme, S.E. $\frac{3}{4}$ S. nearly a quarter of a

* See the Plan of Port Elliot, No. 2,493; scale, $m = 14$ inches.

mile from Commodore point. This isle is a mass of granite rocks, 20 feet high, with 5 fathoms close along its outer shore; but from its north-west side a reef projects more than $1\frac{1}{2}$ cables' lengths towards the main-land, having near its northern edge the Sisters rocks, and another cluster of rocks above water, at about 120 yards to the eastward of them.

THE SOUTH-WESTERN ENTRANCE, between the breakwater and the Sisters, is 150 yards wide, with 5 to 3 fathoms on a rocky bottom; but it is divided into two passages by the Twins, sunken rocks, which are marked by a *red* nun-buoy. Two round *red* beacons on the northern shore, kept in one bearing, N.N.W. $\frac{1}{4}$ W., lead, in 3 fathoms, through the passage on the east side of the Twins.

THE NORTH-EASTERN ENTRANCE.—The South-western entrance being so contracted by the Twins rock, it is recommended to enter Port Elliot by the North-eastern entrance between Commodore point and the reef projecting from Lipson isle. Two *white* triangular beacons on the western shore, kept in one, bearing West, lead, in 16 feet, through the fairway by a *black* can-buoy, which may be passed on either side.

MOORINGS.—There are two sets of heavy moorings laid down; one, with two bridles, in Port Elliot, between the Sisters rocks and the north-west shore, and the other in what is known as the outer harbour, between the north-east extreme of Lipson isle and Commodore point. Vessel drawing 12 feet, may ride by the bridle at the outer buoy, but those of less draught will find better shelter at the inner one. The moorings in the outer harbour consist of anchors and chains of similar size to those in the port, and will accomodate three vessels of very large tonnage.

JETTY.—At about $1\frac{1}{2}$ cables' lengths north-westward of the breakwater there is a jetty running out, according to the Admiralty plan of 1856, to a depth of 7 feet at low water.*

DIRECTIONS.—In approaching Port Elliot with a southerly wind, close the north-east extreme of Lipson isle, where there are 5 fathoms water close to the rocks; but the anchorage being confined, a stranger should not enter without having first made a signal, which will be answered by the harbour master, who will either go off in his own boat, or make a signal for one to be sent for him. Small vessels should lie as close as possible under Lipson Isle reef.

If entering by the south-western passage, masters of vessels must first make sure that the swell is not too heavy, as it frequently breaks across the channel in the finest weather, without any previous warning.

* According to the testimony of several shipmasters frequenting Port Elliot, that harbour appears to be fast filling up; the depth of water at the end of the jetty and in other parts being very considerably less than when reported by Commander Lipson, in 1853.—*Wellbank's Nautical Almanac*, 1864.

To Moor.—There being moorings of the heaviest and best description in Port Elliot for five vessels of large tonnage, the harbour master cautions masters of vessels not to trust to their own anchors in the inner harbour, as the rollers setting in through the south-western entrance keep the bottom in so disturbed a state that it cannot be depended upon as a holding-ground.

Vessels using the moorings, not having hawse-pipes large enough to receive the bridles, should have both their own cables shackled on to the bridles, and veer according to the state of the weather, observing that with north and north-east winds, it will be necessary to ride with a shorter scope, to keep clear of the foul ground near the breakwater.

Masters of vessels using the moorings are required to land the mooring buoys, if desired to do so by the deputy harbour master ; and in all cases must observe the instructions of that officer respecting the moorings, or they will be held liable for any loss or damage that may occur to the moorings, whether from neglect or accident on their part.

The following lay-days will be allowed for vessels using the moorings :—

Vessels not exceeding 60 tons	-	-	-	-	-	4 days.
„ „ 100 „	-	-	-	-	-	7 „
„ „ 200 „	-	-	-	-	-	14 „
„ „ 300 „	-	-	-	-	-	21 „

and so on in like proportion.

Vessels under 50 tons will not be permitted to ride at the moorings, in the event of large vessels requiring them.

The deputy harbour master is empowered to grant an extension of lay-days, in the event of bad weather having prevented vessels from loading or discharging. Masters of vessels are, however, reminded that additional time will only be granted to those who have taken due advantage of every opportunity afforded them for working.

Water.—Fresh water from a reservoir was, in 1853, about to be led by pipes to the end of the jetty, for the convenience of shipping.

REMARKS.—“Any one visiting this district must see, from the immense tracts of fine agricultural land to the eastward and westward of Port Elliot, how much the settlers will be benefited by a place of shipment, where, from the proximity to the neighbouring colonies, two voyages may frequently be made for one from Port Adelaide.” *

TIDES.—It is high water in Port Elliot, full and change, at about 1 h. ; rise, 5 to 6 feet.

FRENCHMAN ROCK.—The coast from Commodore point trends northward about half a mile to a small bight receding to the westward ; and

* South Australian Directory, by Commander Lipson, 1853.

near this coast lies Frenchman rock, bearing N.E. by E. $\frac{1}{4}$ E., distant three-quarters of a mile from Commodore point.

SEA MOUTH of MURRAY RIVER.—From Frenchman rock the northern coast of Encounter bay extends nearly 10 miles in an E. by S. direction to the sea mouth of Murray river, which may be recognized by Barker knoll, about 90 feet high, and is the first bare sand-hill of any elevation or extent, to the eastward of the high land of Encounter bay.

BARKER KNOLL.—This extraordinary hill, which forms the eastern side of the sea mouth of Murray river, is ever changing in its form and appearance, according to the prevailing winds, and is fast receding to the eastward, in which direction the entrance has shifted 500 yards in four years. A flag-staff was erected on the highest part of the knoll, in lat. $35^{\circ} 34' S.$, long. $158^{\circ} 57' 30'' E.$, and bearing East, distant $10\frac{1}{2}$ miles from Port Elliot obelisk.

SIGNAL STATION.—According to Wellbank's Australian Nautical Almanac there is a flag-staff on the highest part of point Pullen, the eastern termination of Sir Richard peninsula, from which the tidal and other signals are made.

The CHANNEL through the sea mouth, or entrance of Murray river is bounded to the eastward by the East bank, which extends a considerable distance to the south-westward from the base of Barker knoll; and the edge of the shoal, extending from the West bank to Pullen spit, forms the western limit of the channel.

The Bar, which consists of sand, covered with masses of sea-weed, had recently depths of 6 to 8 feet on it; but it is constantly shifting and altering in extent, depth, and relative position to Barker knoll. It has been observed that the heaviest rollers break well outside the bar, in $3\frac{1}{2}$ to $4\frac{1}{2}$ fathoms, whilst the bar is tolerably free from rollers of any considerable height.

Within the bar the soundings vary considerably, and the channel will generally be found deeper and more direct in the winter months, trending more in a westerly direction as the descending currents become lessened in volume during the summer.

Leading Beacons.—In order to point out the deepest water over the bar, two large beacons have been placed within the entrance. The upper or inshore beacon, which is painted *red*, is 27 feet high, and placed on a sand-hill 23 feet above low-water mark. The outer or lower beacon, which is painted *white*, is 20 feet high.

These beacons, which are shifted as occasion requires, will not be observed until the channel is nearly open; vessels to the eastward will

shut them in by Barker knoll, while those to the westward will find them obscured by the sand-hills on Sir Richard peninsula.

DIRECTIONS.—In the event of a vessel arriving off the sea mouth of Murray river, and finding the surf too heavy for her to attempt the bar, she is recommended to proceed to Port Elliot or Victor harbour, in either of which places she may safely wait for a favourable opportunity to cross the bar, which is not likely to occur whilst the sea breaks heavily on Seal rock, as by this a fair estimate may be formed of the state of the bar.

The master of a steamer having taken all the requisite precautions, if at all acquainted with the entrance, should steer towards it; but before shoaling the water to less than 5 fathoms, he should bring the leading beacons in line. If the bar be not quite smooth, he will do well to keep his vessel in this position, in order to observe steadily that the rollers do not break with sufficient force to endanger the steering of the vessel.

Being satisfied that the bar is safe, the vessel may be steered boldly in, keeping in line with the beacons. On approaching the centre of the bar, masters of vessels must carefully guard against an eddy which exists on the western side of the channel and tends to draw vessels on that bank. Having passed Barker knoll, the channel becomes somewhat intricate.

Tidal Signals.—The following signals will be displayed from the flag-staff, on vessels approaching the bar from seaward, or intending to proceed to sea :—

First quarter flood—Red flag at mast-head.

Half flood - - — „ „ ; ball at east yard-arm.

Last quarter flood — „ over ball at east yard-arm.

High water - — „ „ mast-head.

First quarter ebb —Blue flag at mast-head.

Half ebb - — „ „ ; ball at west yard-arm.

Last quarter ebb — „ over ball at west yard-arm.

Low water - — „ „ at mast-head.

As it frequently occurs that, owing to freshes and other causes, the tide rises without the stream setting over the bar from seaward, the following distinctive signals are, in such cases, rendered necessary: instead of one ball with the flood tide signals, *two* will be used. Vessels must, therefore, be prepared at these times to enter the river without the assistance of the in-going current.

In the event of any accident happening to the beacons, by which the navigation might be rendered hazardous, or more than usually difficult, without extraordinary caution being observed on the part of the master of

the vessel approaching the bar, the following signal will be hoisted, on a vessel nearing the channel from seaward :—

Beacons out of position { Red flag at mast-head, with ball at each yard-arm.

After the above signal is made, and the approaching vessel has answered by dipping and rehoisting her colours, the usual tidal signal will be displayed, which should be replied to in the same manner.

Should the beacons be out of position, the vessel must remain outside for farther directions, when the following signals will be made, to guide her in as required.

Open the low beacon to the *eastward* { Blue flag at east yard-arm without a ball.

Open the low beacon to the *westward* { Blue flag at west yard-arm without a ball.

On the vessel attaining the necessary position and direction, the signal will be hauled down, when she must continue her course steadily, until she arrives between Barker knoll and Pullen spit.

Should either of the beacons be removed from any unforeseen accident, so as to leave no guide for vessels approaching or leaving the channel, the *blue* flag over the *red* flag will be hoisted at mast-head. In such a case the passage over the bar should not be attempted without a pilot, or until the beacons are replaced, which service will always be executed without delay.

If proceeding outwards, the signalman will board the vessel before rounding Pullen point, and give the master the necessary information and instructions verbally.

No allusion has at present been made to sailing vessels crossing the bar ; little difficulty, however, would be found, provided they have fair winds of sufficient force to give them good steerage way ; but no sailing vessel should at any time attempt the passage with a scant or light wind, unless it be quite smooth on the bar.

TIDES.—It is high water at the sea mouth of Murray river, full and change, at 2 h. ; ordinary springs rise about $3\frac{1}{2}$ feet. The ebb stream runs out of the mouth from $3\frac{1}{2}$ to $4\frac{1}{2}$ knots ; this strong set, opposing the ocean swell, causes heavy rollers in bad weather, to break with great violence outside the bar. The flood, which rarely runs longer than 3 hours, does not often attain a greater velocity than 2 knots.

During neaps the tides are irregular, the sea breeze, which generally sets in at about noon, often bringing in the flood. Westerly gales, as usual on all parts of this coast, bring in the highest tides.

LAKE VICTORIA and ALBERT.—Within the sea mouth of the Murray there are three openings, leading into lake Victoria, which is 20 miles long, East and West, 10 miles wide, and forms the estuary of the

river which flows into its eastern end. On the south side of the lake, a narrow opening leads nearly 5 miles south-eastward, into lake Albert, which is about 5 miles wide, and extends 10 miles southward, to within 3 miles of the sea coast.

GOOLWA, or the LOWER MURRAY, the westernmost of the three channels between the sea-mouth of the Murray and lake Victoria, extends nearly W.N.W. 6 miles from the inner entrance of the sea mouth of the river, to the township of Goolwa. It trends along the south side of Hindmarsh island, and in nearly a parallel direction with the northern shore of Encounter bay from which it is separated by a long neck of land only about a quarter of a mile to three-quarters of a mile broad.

The entrance of this channel, immediately to the northward of Pullen spit, is divided into two passages by West shoal, which dries with the ebb. The northern is the more direct passage ; but it has in some parts only 6 feet at low water, whilst that to the southward of the shoal has 9 feet.

The channel between West bank and the township of Goolwa varies from about 120 to 300 yards in width, with 10 to 29 feet water. Between West bank and one of these narrows, about two-thirds of a mile farther up, is Port Pullen, on the north side of Pullen point, in which there are 9 to 11 feet water.

Between half a mile and three-quarters of a mile below Goolwa jetty the channel is again divided into two narrow passages by Middle shoal, the northern being the direct passage ; there is said to be rock at about 3 cables' lengths below the east extreme of the shoal.

River Beacons.—Above West shoal, beacons have been placed on the steep sides of the banks forming the channel to the township of Goolwa. The *black* beacons, which have round tops, are on the south side ; and the *red* beacons, which have lozenge-shaped heads, are on the north side. By keeping the black beacons on the port, and the *red* beacons on the starboard side in going up ; and the contrary in going down, there will be no difficulty in navigating the channel from West shoal to Goolwa jetty, by any vessel that can cross the bar.

The Buoys, formerly used to mark the shoals, have been removed.

ANCHORAGE.—On arriving off the township of Goolwa, there is ample space to anchor in $2\frac{1}{2}$ to $3\frac{1}{2}$ fathoms at a convenient distance off the jetty.

Masters of vessels having a limited knowledge of Encounter bay and the entrance of the Murray, will be only acting prudently if they avail themselves of the services of the harbour master stationed at port Elliot, or any other duly qualified pilot, to guide them through the entrance. The presence of an officer properly qualified for this duty, who is directed

to afford every information respecting the Murray, will enable masters of vessels to acquire the necessary experience to enable them to conduct their own vessels in future.

From the township of Goolwa the channel of the lower Murray trends 8 miles in an easterly direction along the north side, to the east point of Hindmarsh island, and has two creeks branching off to the north-westward. From the east point of the island the channel continues eastward 5 miles to the entrance of lake Victoria.

HINDMARSH ISLAND is 13 miles long, East and West, and 4 miles broad, its south-east side being separated by a narrow opening from Mundoo isle, between which and the extensive shoals to the eastward, the Admiralty chart shows a 6-feet channel leading to the entrance of lake Victoria.

COORONG, the easternmost of the three openings between the sea mouth of the Murray and the entrance of lake Victoria, trends 7 miles eastward between the extensive shoals on the north, and Younghusband peninsula on the south side to the entrance of Coorong, an extraordinary creek resembling a canal, extending 70 miles along the back of the beach to the south-eastward. This inlet is 1 to 2 miles wide, the barrier or beach which separates it from the sea-coast being rarely more than 1 mile across.*

A LIFE-BOAT is stationed at the sea mouth of the river Murray ; and there is a rocket apparatus in Encounter bay, so that, in the event of a vessel stranding, and the lives of the crew being in danger, assistance will, if possible, be rendered from the shore, as directed at page 54.

The SOUTH COAST, from the sea mouth of the Murray, extends S.E. $\frac{1}{4}$ S. 74 miles to cape Morard, and is one uniformly low sandy shore, slightly curved and rising to small sand-hummocks, which bound the view of the interior from passing vessels, and are not sufficiently remarkable to be recognized from different points of view. The soundings are generally 17 fathoms at 3 miles off the shore, until it is approached at about 10 miles northward of cape Morard, where the French chart places breakers at 3 miles from the land ; but whether connected with it, and of what extent, has not been ascertained. Captain Flinders passed in 10 and 11 fathoms, coral bottom, within $1\frac{1}{2}$ miles of this spot, without observing any danger except breakers fronting the shore abreast of it, to the extent of half a mile, in a space of nearly 12 miles ; but he had afterwards, very irregular soundings between 7 and 13 fathoms, at 3 to 4 miles off shore to the southward ; and there are 10 fathoms at about 5 miles to the south-westward of cape Morard.

* See Chart : Australia, South Coast, Sheet 4, L'acepède bay to cape Otway, No. 1062 ; scale, $m = 0.08$ of an inch.

CAPE MORARD, the northern point of Lacedède bay, is a slight projection of the sandy coast, only remarkable from the granite rocks close to the southward of it, and Nation rock, which lies $2\frac{1}{2}$ miles to the southward of the cape: there are 3 and $3\frac{1}{2}$ fathoms between the latter rock and the shore.*

LACEPÈDE BAY extends from cape Morard S. by W. $\frac{1}{2}$ W. 22 miles to cape Bernouilli, and is 6 miles deep, with low sand-hills along shore, gradually rising northward, to the height of 30 feet. At nearly midway from cape Morard to cape Bernouilli is Maria creek, on the south side of which is Kingston. For about 10 miles southward from cape Morard, there are 3 and 4 fathoms within a mile of the shore; but the surf here breaks upon it. From 3 miles northward of Maria creek to cape Bernouilli, the shore is fronted by a flat, the 3-fathoms edge of which projects $1\frac{1}{2}$ miles from the creek, and $2\frac{1}{2}$ from the beach at 4 miles farther to the south-westward; but within 7 miles of cape Bernouilli, the shore may be approached to the distance of $1\frac{1}{2}$ miles in 4 fathoms.†

At 6 miles off Maria creek there are 10 fathoms, from whence the soundings gradually decrease to 6 fathoms at 2 miles South of cape Morard, and 4 fathoms at $1\frac{1}{2}$ miles northward of cape Bernouilli, with gradually decreasing depths towards the shore. But Lacedède bay is quite open to the north-westward and unfit for anchorage, except in its southern part, where it is sheltered from all winds from N.E. round by South to West, by the shoals which stretch out from, and lie off the cape.

ANCHORAGE.—The best berth for a large vessel in Lacedède bay is in 5 fathoms on a clear sandy bottom, with cape Bernouilli bearing South distant $1\frac{1}{2}$ miles. A smaller vessel may lie farther in, according to her draught. Here are no heavy seas, and a vessel, with ordinary attention, may ride out the heaviest gale in comparatively smooth water.

Water may be obtained in any quantity by digging at the base of the sand-hills near the beach.

CAPE BERNOUILLI is a sandy projection, rising from the beach to a moderate elevation, and is well clothed with small wood. A shoal spit extends N.W. by W. $1\frac{1}{2}$ miles from its north extreme, and from the south-

* Part of the South coast of Australia has lately been examined by Commander Lipson, R.N., from whose published remarks thereon, portions have been introduced into the present edition of this work. The different names on the coast to the southward and eastward of Encounter bay, by Commander Lipson, have not, however, been generally adopted, as they are not the names bestowed by the discoverer, Captain Nicolas Baudin, of the French corvette, *Géographe*, in 1802.

† See Plan of Lacedède bay on Chart, No. 1062; scale, $m=0.25$ of an inch.

west point of the cape, at 1 mile farther to the southward, a rocky spit stretches out $2\frac{1}{2}$ miles to the westward. There is a bight between the two spits $1\frac{1}{2}$ miles in extent, with 4 fathoms in the centre and $2\frac{1}{2}$ fathoms at half a mile from the cape.

BROCK ISLET, on which a beacon has been erected, lies nearly West $3\frac{1}{2}$ miles from the south-west extreme of cape Bernouilli; it is 330 yards in circumference and is visible at the distance of 3 miles; there are several other rocks about the islet, the group being situated near the centre of a shoal 3 miles long, N. $\frac{1}{2}$ W. and S. $\frac{1}{2}$ E., and three-quarters of a mile broad. There is a 5-fathoms' channel, half a mile wide, between Brock islet shoal and the rocky spit extending from the cape, and there are 5 and 6 fathoms on both sides of this shoal.

CAUTION.—Masters of vessels are cautioned against approaching Brock islet shoal within the distance necessary to discern the islet, as the almost perpetual ocean-swell breaks without warning, over patches of foul ground, which extend to a distance of 3 or 4 miles from the reef.

SESOSTRIS REEF, reported in the "Sydney Gazette" to have been seen in 1826, was said to lie about 16 miles to the westward of cape Bernouilli, which position nearly agrees with that of a reef on which the ship *Margaret Brook* was said to have been wrecked, at about West 18 or 20 miles from the cape; the ship *Rivals* being also reported to have struck on the same reef.

CAUTION.—So much doubt, however, exists as to the position and even the existence of this supposed danger, that it has been expunged from the Admiralty charts; but masters of vessels approaching this part of the coast should do so with caution, and should be careful to ascertain the positions of their vessels before attempting to round cape Bernouilli, as the current sets round it to the north-eastward, and has a tendency to draw vessels towards Brock reef.

BREAKERS.—At S. $\frac{1}{2}$ E., 4 miles from Brock islet, a heavy continuous break has been observed, and has probably been often mistaken for that on the southern rocks of Brock islet reef, from which, however, it is distant fully 2 miles. According to the Admiralty chart, there are other breakers at about 2 miles farther to the southward.

BAUDIN ROCKS.—From cape Bernouilli the well wooded coast trends S.S.E. $\frac{1}{2}$ E. 11 miles to a projection forming the north point of Guichen bay, and from which a reef extends $1\frac{1}{2}$ miles in a S.W. direction to Baudin rocks, which, being high, are visible at a distance of 7 miles. The reef continues from these rocks about 1 mile in a south-easterly direction, its extremity forming the northern entrance point of Guichen bay.

CAPE DOMBEY, nearly S. by E. $\frac{3}{4}$ E. 15 miles from cape Bernouilli, is a sandy point of moderate elevation, and forms the southern point of Guichen bay. The cape may be known by an obelisk, painted *red* and *white*, in horizontal stripes, on its extremity ; it is 40 feet high, and, being 100 feet above the level of the sea, it is visible in clear weather, 12 miles from the deck of a moderate sized vessel. From the cape, a reef of rocks runs out nearly $1\frac{1}{4}$ miles in a N.N.W. direction ; its extremity forming the south side of the entrance of Guichen bay.

BREAKERS extend nearly 2 miles from the coast near cape Dombey ; and from their treacherous nature and the heavy ocean-swell setting directly on them, they should be most carefully avoided. At 2 miles off these breakers there are 15 fathoms, and 35 to 38 fathoms at 18 miles off the land. According to the French chart, there are 60 fathoms at about 21 miles to the S.W. by W., by which it would appear that the bank of soundings does not extend very far from the shore.

GUICHEN BAY is formed between cape Dombey and the point of the main-land at $4\frac{1}{2}$ miles to the northward of it, the entrance between the reefs extending from cape Dombey and Baudin rocks being about 2 miles wide, and the depth of the bay being nearly 3 miles. From a mile eastward of the north point of the bay, a clear sandy beach trends S.S.E. about 4 miles to the south bight of the bay.

The soundings are regular, gradually decreasing from 7 or 8 fathoms in the entrance to 3 miles close to the beach, with everywhere a clear even bottom of good holding-ground, with only a few rocky points near the township, and terminating at a short distance from the beach.

MOORINGS.—Frigates' moorings have been laid down in 4 fathoms, under the shelter of cape Dombey and its reef, where two vessels of any tonnage may be accommodated, the water being rather deeper at the eastern buoy.

ROBB TOWN is situated near the shore within cape Dombey, and has a convenient jetty with a tramway from the road to the jetty, and where there is a depth of 6 feet at low water. Boats can load here in any weather, by having a line fast to a grapnel outside.

DIRECTIONS.—A vessel bound to Guichen bay from the northward, should carefully avoid Brock islet reef, off cape Bernouilli, by keeping at least 10 miles off the cape ; for, though the outer rock is not more than 4 miles off the cape, the bottom is so uneven that the sea often breaks in deep water, with such violence, in bad weather, as would jeopardize a small deep-loaded vessel.

Having sighted the obelisk, and brought it to bear S.E., distant 6 miles, and Baudin rocks East $2\frac{1}{2}$ miles, steer S.E. by E., keeping the reef off

Baudin rocks on the port hand, or to the eastward, until the obelisk bears S.S.W. $\frac{1}{4}$ W., when shorten sail and run for the moorings or anchorage, keeping close to the eastern mooring-buoy : or by passing between the two buoys, small vessels will find excellent anchorage in 3 fathoms, inside the buoys, with the pier-head bearing S.S.W. $\frac{1}{2}$ W., and the obelisk W. $\frac{1}{2}$ N. A good scope of chain should be veered at once, and a second anchor should be ready to let go in the event of bad weather.

Small vessels, in the winter season, should carefully avoid anchoring too close to a rocky point at the eastern end of the town, as, in the event of their wanting to veer cable, such a position might be inconvenient.

From the Southward, a vessel bound into Guichen bay should bring the obelisk to bear S.E., distant $2\frac{1}{4}$ miles, when the point of the reef will bear E.S.E. ; having a leading wind, run in East until the obelisk bears S.S.W., then shorten sail and run in for the mooring-buoys or anchorage.

Beating in.—A vessel may safely work into Guichen bay against a head wind, by not borrowing too closely upon the reefs, and by keeping the lead going, taking care not to approach too closely the shelf which lies inside cape Dombey, in line with the mooring-buoys.

To Moor.—Vessels picking up the moorings must haul up on the small chain until they can shackle on to the $1\frac{3}{4}$ -in. buoy-chain, of which there are 37 fathoms to each buoy, a sufficient length to heave in to the bitts. But in the event of vessels not having hawse pipes large enough, it will be necessary for them to shackle on their best, or both bower chains, if requisite, on the approach of bad weather. On such an occasion large vessels should also veer, by using their own chains, so as to ride easily, in case of any swell coming in.

A LIFE-BOAT is stationed in Guichen bay ; and there is a rocket apparatus, so that in the event of a vessel stranding in the vicinity of the bay, and the lives of the crew being in danger, assistance will, if possible, be rendered, as directed at page 54.

The BAROMETER in this bay, as is generally found on all parts of the coast, is an invaluable guide : the mercury falling with a north-east wind and sultry close weather in the winter season, is a sure precursor of bad weather, for which preparation should be made.

The COAST from cape Dombey trends nearly S.E. 25 miles to cape Jaffa, and consists of a sterile sandy bank, with hummocks upon it, visible at the distance of 12 miles. Cape Rabelais, nearly midway between capes Dombey and Jaffa, is surmounted by a peaked hill, and has some sunken rocks close to the southward of it.

BREAKERS.—At about 6 miles to the southward of cape Rabelais, and 3 miles from the shore, the water from seaward, shoals suddenly from 14 to 7 fathoms, deepening again inside, which causes very heavy breakers and dangerous rollers. At this spot Commander Lipson found the wreck of

the cutter *Thompson*, which was probably swamped by these rollers, when all on board perished.

CAPE JAFFA.—From its west extreme, cape Jaffa trends $1\frac{1}{2}$ miles to its south-east extremity, which forms the north-western entrance point of Rivoli bay. This cape and the Penguin islets, which lie close off its south point, are enclosed by a ledge of rocks, with heavy breakers on it, extending at least half a mile from the shore.

RIVOLI BAY.—The entrance of this bay extends from the Penguin islets S.E. $\frac{3}{4}$ E. nearly 6 miles to cape Buffon: but within the entrance the bay is nearly 8 miles long in the same direction and is 2 miles deep.*

A reef $1\frac{1}{2}$ miles long, E.S.E. and W.N.W., and half a mile broad, lies off the entrance of Rivoli bay, the north-west end of the reef bearing S.S.E., distant $2\frac{1}{4}$ miles from the south point of cape Jaffa. There are 10 and 12 fathoms at about $1\frac{1}{4}$ miles outside the reef, from whence the soundings gradually decrease to 5 and 7 fathoms close to the back of it.

LIPSON and SHERBERT ROCKS lie respectively S.E. by E. $\frac{1}{4}$ E. $1\frac{1}{2}$ miles, and S.E. by E. $\frac{3}{4}$ E. $2\frac{3}{4}$ miles, from the Penguin islets. Each rock is surrounded by a reef, the former half a mile, and the latter a quarter of a mile in extent. There is a 2-fathoms patch of foul ground at about half a mile to the north-eastward of Sherbert rock, and there are two small 3-fathoms patches, one lying N.N.W. $\frac{1}{4}$ W., and the other N.W. $\frac{3}{4}$ W. each $1\frac{1}{2}$ miles from cape Buffon. Between all these reefs, and between them and the shores of Rivoli bay, there seem to be clear channels, with 4 to 8 fathoms; the deepest water being apparently within a mile of the eastern shore.

ANCHORAGE.—There appears to be anchorage in the north-west and south-east bights of Rivoli bay: the former in 3 fathoms, sheltered from all but southerly winds, and the latter in 3 to 4 fathoms, sheltered from all but north-westerly and westerly winds.

TIDES.—It is high water in Rivoli bay, full and change, at 10 h.; rise 4 feet. The tide is uncertain on this part of the coast; small vessels should therefore be very cautious and get an offing in time, as the sea is here heavy and rises quickly.

CAPE BUFFON, the south-eastern entrance point of Rivoli bay, is a narrow point projecting nearly two-thirds of a mile to the north-westward, and has a reef extending 1 mile to the westward, on the outer extremity of which there appears to be a rock above water.

From cape Buffon the coast extends nearly S.E. $\frac{3}{4}$ S. 20 miles to cape Banks (or cape Buffon of Baudin); it is slightly curved, with a sandy

* See Plan of Rivoli bay on Chart, No. 1062; scale, $m = 0.5$ of an inch.

frontage, topped with sand-hills somewhat higher than before ; and has a few large stones along the southern part of the beach. There is a range of moderately high hills at about 8 miles inland, between capes Buffon and Banks, its southern end terminating at the Bluff, at 12 miles to the north-eastward of the latter cape.

CAPE BANKS is a sandy projection, remarkable from having a conspicuous white sand-hummock on its extremity. At 4 miles off cape Banks there are 24 fathoms, on a rocky bottom, the depth quickly increasing to 50 fathoms, grey sand, at 12 miles to the westward, beyond which the soundings are rapidly lost.

In the French chart by M. Freycinet, a small patch of covered rocks is placed W. $\frac{3}{4}$ N. $7\frac{1}{2}$ miles from cape Banks ; but Captain Flinders passed over the spot in the same month, without observing any danger ; and the *Investigator's* tracks having crossed each other several times within a mile of the same position, there is reason to conclude that this supposed danger must have been a harmless rippling of the water.

DESTAING BAY and CAPE BOUFFLERS.—Destaing bay extends from cape Banks S.E. 7 miles to cape Boufflers, and is 2 miles deep ; but the northern and greater portion is occupied by reefs extending $2\frac{1}{2}$ miles from the shore. The two islets or rocks shown on the Admiralty chart, nearly 3 miles to the south-eastward of cape Banks, although they appear as such from the sea, are part of the main-land, forming a cove, where two vessels of 100 tons might lie.

The coast from cape Boufflers trends E.S.E. $8\frac{1}{2}$ miles to cape Northumberland, and is more elevated than before, with a clear shore and bold soundings.

MOUNTS GAMBIER and SCHANCK are two remarkable hills near each other ; the former is peaked and bears from cape Banks E. by N. $\frac{1}{4}$ N., distant 15 miles ; and the latter, which is of a flat table-like form, bears from the cape East, distant 16 miles. There are some hills of minor importance to the eastward of them, upon a range of moderately high and sandy land which curves round south-eastward towards cape Bridgewater.

ALBION ISLE, said to have been seen off this part of the coast in 1802, by the ship *Albion*, or by the *Britannia*, was laid down on Flinders' chart in about lat. $38^{\circ} 16'$ S., long. $139^{\circ} 41'$ E., or W.S.W. 45 miles from cape Northumberland ; and by M. Freycinet, doubtfully, in lat. $38^{\circ} 40'$ S., long. $139^{\circ} 5\frac{1}{2}'$ E. But Captain Flinders, when near the former position, tried in vain for soundings with 200 fathoms of line. As it has been since reported that this island does not exist in the former position assigned to it, and appears not to have been seen by any other ship than the *Albion*, it has been expunged from the Admiralty chart ; but this locality should

be approached with caution. The *Investigator* had 50 fathoms, sand and shells, at 9 miles to the westward of cape Northumberland, and found the depth increase to 70 fathoms, fine sand, 7 or 8 miles farther to the S.S.E.; but from this it quickly shoals to the eastward, and is only 25 fathoms, broken shells, at S.E. by S., 7 miles from the cape.

CAPE NORTHUMBERLAND is a prominent head-land, which, independently of Macdonnell light-house standing on it, may be easily known in the daytime, by mounts Gambier and Schanck, to the northward of it. The extremity of the cape is enclosed by a reef, on which are some rocks, those apparently most worthy of notice being the Carpenters, two rocks immediately in front of the cape.

LIGHT.—The light-house on cape Northumberland, which is situated in lat. $38^{\circ} 3' S.$, long. $140^{\circ} 37' 45'' E.$, has a tower 28 feet high, standing on a rocky point 95 feet above high-water mark. The light, which is catoptric and *revolving*, has three faces, and exhibits alternately, every minute, a *white*, *red*, and *green* light, visible from seaward, between the bearings of about E. by N. $\frac{1}{2}$ N. and W.N.W. The *white* light may be seen from the deck of a moderately sized vessel at about 18 miles off.

The *red* light will not be seen, under the most favourable circumstances, at a greater distance than 15 miles.

The *green* light will not generally be distinguished beyond a range of 8 miles.

During hot weather and north-east winds, when there is often much refraction, the *white* light will be frequently observed at a great distance. The light-keepers are provided with a 9-pounder carrouade, and a code of Marryat's signals, which will be used to warn vessels, if observed standing into danger.

DIRECTIONS.—Vessels approaching cape Northumberland from the north-westward, should never sight the *white* or *red* light on a bearing more southerly than E. $\frac{1}{2}$ S., and on seeing the *green* light should immediately alter the course more southward, so as to give a good berth to the outlying reefs westward of the cape, which run parallel with, and extend 1 mile from the shore.

Vessels from the eastward should not bring the *white* or *red* light to bear to the westward of W.N.W., and when the *green* light becomes visible on that bearing should steer more southerly, in order to give a wide berth to the reef which stretches to the eastward from cape Northumberland.

In bad weather, with the wind hanging from the southward, it will be advisable to keep cape Northumberland at such a distance as will enable a vessel to pass the light-house without seeing the *green* light; and should the weather be thick, or it be blowing hard, it will be prudent not to sight the *red* light, which, under such circumstances, will not be seen at the former distance.

The coast to the north-westward of cape Northumberland soon becomes low, and, owing to the heavy ocean-swell which sets directly on the shore, should be very carefully avoided. Commander Lipson considers more attention and care are required in navigating between capes Northumberland and Bernouilli than on any other part of the coast he had seen.

TIDES.—It is high water at cape Northumberland, full and change, at 8 h. ; rise 5 feet. The streams are somewhat irregular, but the flood sets to the eastward.

CURRENT.—Cape Northumberland being about the northern limit of the stream of current which is usually experienced running to the eastward, from Cape Leeuwin through Bass strait, has much deeper water along the shore to the southward and eastward of it than to the northward ; and the bank of soundings is contracted to a smaller distance from the shore towards King island in Bass strait, than in the space round the Great Australian bight to the Archipelago of the Recherche. Therefore, in approaching any part of the South coast outside of these limits, during the night, soundings must not be expected many miles from the shore ; and in no part do they appear attainable at a greater distance than when the land may be seen in the day-time.

An eddy current to the northward has sometimes been experienced, within 10 or 12 miles of the land, between cape Northumberland and L'Acropole bay ; apparently occasioned by a current which Captain Flinders found in the middle of April, setting towards the cape from the W.S.W. at the rate of half a knot, and which then took nearly opposite directions, to the northward and S.E., parallel to the general trending of the coast.

MACDONNELL BAY is a very slight indentation of the coast, extending E.N.E. about 6 miles from cape Northumberland, and affords shelter for coasters, from north-westerly and northerly winds, within Breaksea reef, the southern edge of which extends E. by S. $2\frac{1}{2}$ miles from the cape : two rocky patches lie East half a mile and 1 mile from the east end of the reef, and a small patch lies S.W. by W. three-quarters of a mile from it. From $1\frac{1}{2}$ miles eastward of the cape the shore appears to be bordered by foul ground, extending about one-third of a mile from the beach.*

The best anchorage is in 3 fathoms, with the light-house bearing W. by S. $\frac{1}{4}$ S., and a wreck, which lies near the shore at $2\frac{1}{2}$ miles eastward of the light-house, bearing N. by W. $\frac{3}{4}$ W. ; a vessel will then be about three-quarters of a mile from the beach.

OUTER MOORINGS.—From the southern anchor, which weighs 4 tons, mount Schanck bears nearly N. $\frac{1}{4}$ E., and the light-house West ; and

* See Plan of Macdonnell bay on Chart, No. 1062 ; scale, $m = 1\cdot3$ inches.

from the northern anchor, which weighs $2\frac{1}{2}$ tons, these objects bear, respectively, about N. $\frac{1}{2}$ W. and W. $\frac{3}{4}$ S. ; with 152 fathoms of $2\frac{1}{4}$ -inch mooring chain.

The Inner Moorings, off the jetty, consist of one anchor of about 30 cwt., and 45 fathoms of 2-inch chain, with a small buoy-chain attached : vessels using these moorings must have an anchor in shore.

DIRECTIONS.—Vessels bound into Macdonnell bay from the westward, should keep 3 miles outside cape Northumberland, and from that distance South of the cape, steer about E. by N. till mount Schanck bears N. by W., then haul in north-westward for the anchorage, passing eastward of the patches of breakers which lie East of Breaksea reef. From 6 fathoms, at 1 mile eastward of the eastern patch of breakers the water will shoal to 3 fathoms, on a rocky bottom, as the beach is approached ; in the latter depth the soundings will generally be very regular, as, although the ground is rocky, the patches appear to be composed of limestone flats covered with seaweed. As the beach is approached keep the wreck before noticed, bearing between N.W. $\frac{1}{2}$ N. and N.W. $\frac{1}{2}$ W., in order to avoid the breakers, after which anchor in 3 fathoms, with the light-house bearing W. $\frac{1}{4}$ S., and the wreck N. by W. $\frac{3}{4}$ W. ; and veer not less than 60 fathoms cable.*

To Moor.—Masters of vessels using the moorings, are cautioned against riding by the buoy-chains, which are merely intended to hold the buoys themselves. On a vessel getting hold of the moorings, the buoys should be detached, and the chain hove in until the large chain comes to the hawse, to which the vessel's cable or cables should be shackled, and cable veered, according to the state of the weather. See page 124.

LIGHT KEEPER.—Strangers entering Macdonnell bay for the first time, are recommended to avail themselves of the services of the head keeper of the Macdonnell light-house, who will, should the weather be favourable, come off, if a signal be made for a pilot. The signal-staff will be observed near the light-house, from which the head keeper will communicate, by Marryat's code, should he be unable to get off.

SIGNALS.—A blue and white bad weather flag will be hoisted at the staff near the light-house, on the approach of bad weather, when vessels should seek an offing. When the head keeper of Macdonnell light-house considers

* These directions for entering Macdonnell bay, which are partly extracted from those by Mr. Douglas, President of the Marine Board of South Australia, and partly from the Chart, must be adopted with much caution, whilst so great a difference exists on the Chart relative to the extent of Breaksea reef, and whilst there appears to be some doubt about the position or identity of mount Schanck. By comparing the reef in the enlarged Plan of Macdonnell bay with that on the small scale in the Chart, it will be perceived that according to the former the reef only projects 2 cables' lengths, whilst by the latter it extends $1\frac{1}{2}$ miles from cape Northumberland.

the bay to be unsafe, a blue flag will be hoisted at the staff near the light-house, to warn vessels from entering the bay. The same signal will be hoisted should the moorings be all occupied, in which case vessels entering must anchor, and should be kept in such a condition, with respect to ballast or trim, as will enable them to seek an offing, in the event of bad weather being anticipated.

A LIFE-BOAT is in readiness in case of accident, and there is a pilot boat with coir springs, available for vessels riding in Macdonnell bay. In the event of shipwreck in the vicinity of cape Northumberland, and the lives of the crew being in danger, assistance will, if possible, be rendered, as directed at page 54.

LANDING-PLACE.—WATER.—The landing-place is at about $1\frac{3}{4}$ miles to the eastward of the light-house, and at 1 mile farther to the eastward is a small stream of fresh water.

RUBY ROCK, about E. $\frac{3}{4}$ S. 12 miles from cape Northumberland, was discovered by Mr. Welsh, master of the steam vessel *Ruby*, in 1861; this rock is 4 feet high, and lies 3 or 4 miles off shore.

THE COAST from the east end of Macdonnell bay trends eastward 12 miles to Glenelg river, and from thence 24 miles in a S.E. by E. direction to a bight on the north-west side of cape Bridgewater. The only objects which appear worth notice on this coast are some lakes of good fresh water near the shore, at about 8 miles to the eastward of Glenelg river, and Richmond hill, E. by S. $\frac{1}{4}$ S. 39 miles from cape Northumberland. There are 18 to 24 fathoms on a coral bottom, at 5 to 10 miles from the shore of the bight between capes Northumberland and Bridgewater, which is mostly rocky and should be avoided during southerly or westerly winds.

CAPE BRIDGEWATER is a bold cliffy projection that makes like an island, being joined to the sandy main-land by a low narrow isthmus. A hill near its south-eastern extremity bears nearly E.S.E., distant 41 miles from cape Northumberland, and is visible 36 miles from a ship's deck, in clear weather : it slopes to the edge of the sandy-coloured cliffs, by which the cape is begirt towards the sea ; but on the land side, it descends so low that its connection with the main-land cannot be discerned, unless a vessel is near the shore. It is intended that a light-house shall be built on cape Bridgewater, or on cape Nelson, to the eastward.

At the distances of 4 and 6 miles to the northward, and nearly in a line with the summit of the cape are two other hills nearly equal to it in elevation, rising from very sandy land, almost entirely destitute of vegetation, the northernmost being Richmond hill, just noticed. There are 24 fathoms water at 5 or 6 miles to the westward of this cape ; but on its south side the soundings are much deeper, there being 43 fathoms at 4 or 5 miles off, and 71 fathoms 6 or 7 miles farther to the southward.

CAPE NELSON is a clifly head similar to cape Bridgewater, from which it bears nearly E. by S., distant 8 miles, and forms with it a sandy bight quite open to the southward ; but this cape has no hill upon it like that on cape Bridgewater, the land forming it having rather a level appearance. The shore of the intermediate bight is so barren as to have scarcely a sign of vegetation upon it. Cape Nelson appears bold and safe to approach, having, according to the French chart, 76 fathoms water within 9 miles to the S.S.W., and 58 fathoms within 6 miles to the S.W. of it.

CAPE SIR WILLIAM GRANT, E. by N. $\frac{1}{4}$ N. 4 miles from cape Nelson, projects nearly a mile from the line of coast, and has a remarkable, level summit of tolerable elevation, which falls quickly to seaward, and forms a well defined point, with 11 fathoms at a cable's length off its extremity. The coast between capes Nelson and Sir William Grant forms an exposed bight.

POINT DANGER, N.E. $1\frac{1}{2}$ miles from cape Sir William Grant, is a low projection forming the south-western entrance point of Portland bay ; a shoal spit projects a quarter of a mile from this point, and close outside the spit are some rocky patches on which the sea breaks.

LAWRENCE ROCK, E. by N. $2\frac{1}{4}$ miles from point Danger, is a small but conspicuous islet, having two hummocks on it. A rocky patch, on which the sea breaks, lies midway between cape Sir William Grant and Lawrence rock ; this, together with the other patches inside, renders the passage between Lawrence rock and the main-land too dangerous to be attempted.

PORTLAND BAY may be said to extend from point Danger N.E. by N. about 12 miles to Fitzroy river, and in its south-west part is 5 miles deep, affording good anchorage, sheltered from south-west winds, and although exposed to the eastward, this disadvantage is considerably lessened by the excellent holding-ground, which consists of mud, with a coating of sand.*

From point Danger the south-west shore of Portland bay trends north-westward $1\frac{1}{4}$ miles to Blacknose point, and from thence nearly 2 miles in the same direction to Observatory hill. Except about Blacknose point, from which a shoal spit projects a quarter of a mile, there are 4 and 5 fathoms within $1\frac{1}{2}$ cables' lengths of the shore, with gradually increasing depths outwards, to 17 fathoms at a buoy N.E. by E. $\frac{1}{2}$ E. $1\frac{3}{4}$ miles from point Danger, to 12 fathoms at another buoy lying N. by E. $\frac{1}{2}$ E. $1\frac{1}{2}$ miles from Blacknose point, and to 10 fathoms at $1\frac{1}{2}$ miles north-eastward of Observatory hill.

* See Plan of Portland bay, No, 2504 ; scale, $m = 2$ inches.

The **QUARANTINE GROUND** extends from Blacknose point three-quarters of a mile northward to the quarantine buoy ; and the quarantine station is situated near the shore, at about half a mile to the westward of the point.

OBSERVATORY HILL LIGHT.—There is a *red* fixed light, 116 feet high, on Observatory, or Battery hill, visible from seaward at the distance of 13 miles, between the bearings of N.W. and S. by E. ; and there is a flag-staff close to the light-house.

From Observatory hill the shore trends W.N.W. nearly half a mile, to the entrance of Wattle Hill creek, which winds westward by the southern end of the town of Portland ; from the entrance of the creek the shore curves along the front of the town N. by W. nearly 1 mile to Whaler's Look-out.

WHALER'S LOOK-OUT is a limestone cliff, at a quarter of a mile off which is a reef, with 8 feet water and a buoy on it : there is also a *chequered* buoy, at a quarter of a mile outside the reef, moored in 6 fathoms. Between the reef and a shoal spit projecting from Whaler's Look-out is a narrow 3-fathoms channel.

The shore from Observatory hill to Whaler's Look-out is bordered by a shoal, with 9 to 18 feet water on it, extending 2 cables' lengths to a quarter of a mile from the shore. From $3\frac{1}{2}$, 4 and 5 fathoms close outside the shoal, the depth of water gradually increases to 7 and 8 fathoms at about 1 mile from the shore.

JETTY LIGHT.—At a little more than half a mile from Observatory hill is a jetty, on the outer end of which is a *green* fixed light, and at about 1 cable's length farther to the northward, the Admiralty plan shows another jetty projecting a quarter of a mile into 3 fathoms water.

From Whaler's Look-out the shore, after trending 1 mile to the north-westward, curves about the same distance in a N. by E direction, to a small creek with a saw-mill near it, and thus forms a second indentation in the western bight of Portland bay. This shore is also bordered by a shoal, having 12 to 15 feet water on it, and for the first mile extending about 2 cables' lengths, but farther to the northward, half a mile from the shore. From 4 and 5 fathoms close outside this shoal the soundings increase to 12 and 13 fathoms at about $3\frac{1}{2}$ miles off ; the bottom being generally even, and mostly consisting of sand.

ANCHORAGE.—By keeping within the line of Lawrence rock, bearing S.E. by S., vessels will have 2 miles of clear anchoring ground to the northward of Observatory hill, and nearly an equal space south-eastward to Blacknose point ; and there is no other known danger than the sunken reef off Whaler's Look-out.

MOORINGS.—According to the Admiralty plan, there are moorings in

4 to 6 fathoms, to the northward of Observatory hill ; the inner mooring buoy, which is *red*, lies N. by W., and the outer buoy, which is *white*, N. by E. $\frac{1}{2}$ E., each distant about 4 cables' lengths from the light-house ; there appears to be a third buoy at about 4 cables' lengths to the eastward of the outer mooring buoy.

From the creek by the saw-mill a low sandy beach extends N.E. $3\frac{1}{4}$ miles to some old whaling buildings, and from thence continues in the same direction nearly $2\frac{1}{2}$ miles to Surrey river, at half a mile to the northward of which is mount Clay range. This beach is bordered by a shoal with 6 to 18 feet water on it, extending 2 cables' lengths to two-thirds of a mile from the shore, projecting farthest off the old whaling buildings, where the beach for about 2 miles, is fronted by the Minerva reef, upon which the sea breaks. A small 15-feet patch lies S.S.E. $\frac{1}{2}$ E., 1 mile from the old whaling buildings ; and 2 buoys lie off this beach, one in 11 fathoms, at S.E. $\frac{1}{2}$ S. $2\frac{1}{2}$ miles, and the other in 8 fathoms, E. by S. $\frac{1}{2}$ S. 2 miles from the buildings.

From Surrey river the northern shore of Portland bay extends E $\frac{1}{2}$ N. 6 miles to Fitzroy river, the east extreme of the bay.

DIRECTIONS.—A vessel bound to Portland bay from the westward, should endeavour to sight the high land of cape Bridgewater, which, when seen from the distance of 12 or 15 miles from south-westward, appears covered with white sand patches. She should then steer for the bay, keeping at a convenient distance outside Lawrence rock, and then hauling in to the north-westward. As the vessel proceeds northward the houses of Portland will begin to open out from Observatory hill. Should the wind be scant, the vessel may pass to the northward of the town until it bears S.W., and then tack for the anchorage. A vessel of heavy draught may anchor in 7 fathoms, at about a mile from the town, with Lawrence rock bearing S.E. $\frac{3}{4}$ S. and the jetty W. by S. ; and there appears to be more convenient anchorage, in 6 and 7 fathoms, at half a mile farther to the north-westward.

From the Eastward.—In proceeding to Portland bay from the eastward, a vessel should try to sight Percy isle, which lies E. $\frac{1}{4}$ N. 17 miles from cape Sir William Grant, and may be passed within half a mile. From hence, in clear weather, mount Clay, on the northern shore, and cape Nelson to the westward, may be seen.

Between Percy isle and the main-land is a passage 3 miles wide ; but it is not advisable for a large vessel to go through it, as a heavy swell from the S.W. generally rolls in upon the coast, and frequent calms in summer make it unsafe ; the whole coast being fronted by a border of dangerous rocks, with deep water close outside the shoal, on which there is a continual surf.

At Night.—If a vessel has made out the land before dark, she may safely stand into Portland bay by keeping the lights of the town—which will be visible at the distance of 5 or 6 miles—between the bearings of S.W. and W.N.W., which will give ample room, with smooth water, for working till daylight, or until the vessel is boarded. A boat will always be in readiness to afford assistance when required.

A LIFE-BOAT is stationed in Portland bay.

TIDES.—The tide is very uncertain in Portland bay, it being much influenced by southerly winds; but high water, full and change, may be considered to take place at 12 h.; springs rise 4 feet. In summer when it blows from S.E., there is seldom more than one tide in 24 hours; high water at midnight, and low water at noon. In fine weather, a regular stream runs along the whole coast, from cape Otway—90 miles eastward of Portland bay—to cape Bridgewater, the flood setting to the westward. Between cape Bridgewater and cape Northumberland the tide streams meet, and in stormy weather cause a turbulent sea.

PERCY ISLE, E. $\frac{1}{4}$ N., 17 miles from cape Sir William Grant, and about 5 or 6 miles from the shore, is nearly 1 mile in extent, flat-topped, and about 150 feet high, with perpendicular or over-hanging sides of dark-looking rocks, and covered with grass. Its south side, which is violently beaten by the turbulent seas of the Southern ocean, has rocks extending a little way off it, and from 21 to 24 fathoms water at the distance of nearly 3 miles. It was frequented by sealing vessels from Sydney and Tasmania, and probably afforded them shelter in a small bay, which is said to lie round its north side, but it is only accessible by a boat, on the north-east side.

The COAST from Fitzroy river curves nearly E. by S. $\frac{1}{2}$ S. 12 $\frac{1}{2}$ miles to Shaw river, and from thence sweeps round 9 miles in an E. by S. direction to Griffith isle, on the north side of which is Port Fairy.

PORT FAIRY.—For 7 miles on either side of Port Fairy the coast is low and grassy, to the westward sloping down, with a few clumps of trees to the sea; whilst that to the eastward, being bare of timber, cannot be seen more than 9 or 10 miles from a ship's deck, in the clearest weather. In making this port, the first remarkable land seen will be a saddle-shaped hill on Griffith isle, which is visible in clear weather, at the distance of 12 miles, and cannot be mistaken for any other land in the vicinity, as it is much higher, and is situated outside the line of coast.*

Port Fairy, of which Belfast is the town, is sheltered to the southward by Griffith isle and other small islands lying close together, and separated by a narrow inlet from the low main-land to the westward, the port being

* See Plan of Port Fairy, No. 2506; scale, $m = 6\frac{1}{2}$ inches.

bounded to the westward and northward by an indentation of the mainland.

RABBIT ISLE, which nearly touches the easternmost point of Griffith isle, and forms the south-western entrance point of port Fairy, is a quarter of a mile long, N.E. and S.W., and 1 cable broad at its north-eastern part, from which a point projects three-quarters of a cable's length to the eastward. A shoal extends nearly a cable's length from its south-eastern side ; and its north-eastern shore is bordered by a reef projecting nearly 150 yards in an E.N.E. direction from the east point of the isle. This reef, which is all covered at high tide, and has always breakers on it when there is any swell, may be readily discerned in fine weather, by the kelp on the surface of the water.

LIGHT.—A *red* circular stone light-house stands on the south-east point of Rabbit isle, at about 5 yards from high-water mark. It exhibits a *red* light 41 feet high, visible between the bearings of N.E. $\frac{1}{2}$ E., and S. by E. $\frac{1}{2}$ E., at the distance of 9 miles. The light is fixed, and flashes every three minutes ; when within three miles, the eclipses will be scarcely observable, a continual fixed light being visible between the flashes.

Patches of foul ground extend 3 cables' lengths northward and north-eastward from the north-eastern end of Rabbit isle, and nearly 4 cables, lengths N.W. and S.E.

GRIFFITH ISLE, the central and largest of the cluster of small islands which bound port Fairy to the southward, is nearly half a mile long, N.E. and S.W., and a quarter of a mile broad. It is generally low, with the exception of Saddle hill, and a high sand-hill to the southward of it. Griffith isle is mostly bordered by shoals about 100 yards broad, and connecting it with Rabbit isle. There are three small islets on these shoals, one close to either end, and the third on the north-west side of Griffith isle.

BACK PASS, which separates Griffith isle from the low land to the westward, is barely 1 cable wide at the entrance, and has a 6-foot bar, outside which the depth of water rapidly increases from 2 to 5 fathoms. Within the bar there are 10 to 14 feet water ; but about a cable's length above it, where the channel is contracted to 50 yards in width, there are only 6 feet water. From hence the pass, with gradually increasing width, and depths of 11 to 14 feet, trends nearly N.E. $1\frac{1}{2}$ cables' lengths to a small island, which divides the passage into two small channels, that to the westward having 6 to 12 feet, but that to the eastward of the islet only 1 to 6 feet water. The islet has a spit extending about 50 yards to the south-eastward from it.

The coast to the westward of Back pass is bordered by a shoal ex-
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tending 100 to 150 yards from the shore, and at about 2 cables' lengths from the pass, is intersected by a narrow creek trending a quarter of a mile in a N.E. direction to Sandy cove, and insulating the low land between it and the Back pass. Sandy cove, extends about 2 cables' lengths N.E. and S.W., and is 1 cable wide; but it appears to be nearly filled by a shallow flat.

The bight which forms Port Fairy, extends from the light-house on Rabbit isle N.E. by N. $2\frac{1}{4}$ miles to a point of the main-land, from which Three Mile reef projects 2 cables' lengths to the southward, and the bight is 1 mile deep. It is open from South to S.E., but has regular soundings in 10 to 12, 11 and $5\frac{1}{2}$ fathoms, from about one-third of a mile north-eastward of the light-house to the same distance south-westward of the north-east point of the bay, the depth of water gradually decreasing to $1\frac{1}{2}$ and 3 fathoms at a quarter of a mile from the shore.

From the north-east Point of Port Fairy the low shore curves uniformly round in a south-westerly direction $3\frac{1}{4}$ miles, terminating to the southwards in a point, upon which is a flag-staff on a sand-hummock, bearing N.W. by N., distant 4 cables' lengths from Saddle hill. The plan shows a slaughter-house chimney at about 1 mile westward of the north-east point; also two direction posts at nearly 1 mile, and two others at half a mile northward of the flag-staff. Two ledges of sunken rocks project about $1\frac{1}{2}$ cables' lengths from the shore, between half a mile and a quarter of a mile northward of the south point; and a sand-spit extends a quarter of a mile to the eastward from the point.

MOYNE RIVER flows into the south-west extreme of Port Fairy, between Griffith isle and the south point, on which the flag-staff stands, and is fronted by a 3-feet bar extending across from Rabbit isle to the sand-spit just noticed. From the narrow entrance, between the north extreme of Griffith isle and the opposite point, in which there are 10 to 12 feet water, the river trends W.S.W. 1 cable's length, and communicates with the north-eastern entrance of Back pass, from whence the river takes a N.W. and northerly direction between the town of Belfast and the bay shore, the latter from the south-west point to the southern direction-posts, forming a tongue of land two-thirds of a mile long and about 1 cable broad.

From the entrance to nearly half a mile up, the river is about 50 to 80 yards wide, with generally 10 to 12 feet water, and has several jetties on the western bank. As the river continues northward, it increases in width, and has an islet about half a mile above the flag-staff.

The **ANCHORAGE** is in 6 to 5 fathoms, very fine dark sand, with Saddle hill bearing about S.S.W., and the flag-staff S.W. $\frac{1}{2}$ W., nearly in line with a wind-mill at the southern end of the town, at 2 cables' lengths from the flag-staff. The best berth is when the wind-mill is

open within a quarter of a point to the north-westward of the flag-staff. As the water shoals gradually from this outer anchorage towards the flag-staff, vessels of less than 13 feet draught, may anchor farther in, in that direction.

MOORINGS.—There are three moorings in Port Fairy; the outer one consists of a $25\frac{1}{2}$ -cwt. anchor, with 90 fathoms of $1\frac{5}{8}$ -inch chain, placed in $6\frac{1}{2}$ fathoms, with the flag-staff and wind-mill in line to the south-westward, and the two northern direction posts in line to the north-westward.

The second mooring is a 20 cwt. anchor, with 90 fathoms of $1\frac{5}{8}$ -inch chain, in $5\frac{1}{2}$ fathoms, bearing S.W. by W. from the outer mooring.

The third mooring is a $15\frac{1}{2}$ cwt. anchor, with 90 fathoms of $1\frac{1}{4}$ -inch chain, in $4\frac{1}{2}$ fathoms water, bearing S.S.W. from the outer mooring. To each mooring a *red* buoy is attached.

DIRECTIONS.—After making out Saddle hill, steer so as to pass half a mile to the eastward of the light-house on Rabbit isle; and as soon as the wind-mill at the south end of the town of Belfast opens clear, steer N.W. into the bay until the flag-staff and wind-mill are brought in line, and then make for the anchorage already described, or secure the vessel to the moorings as directed at page 124.

A LIFE BOAT is stationed at Port Fairy.

TIDES.—It is high water at Port Fairy, full and change, at about 12 h.; rise about 4 feet.

The COAST from the north-east point of Port Fairy extends E. by N. $\frac{1}{2}$ N. $3\frac{1}{2}$ miles to Armstrong bay, and is skirted by a sunken reef, running parallel with, and at the distance of half a mile from the shore; vessels working along this part of the coast should therefore not stand too near the land. There are sunken rocks off this bay, some of which lie upwards of a mile from the shore. From Armstrong bay the coast trends S.E. $\frac{3}{4}$ E., $5\frac{1}{2}$ miles to the west point of Lady bay, near which it is rocky, with breakers at $1\frac{1}{2}$ to 2 cables' lengths from the shore.

The coast for about 7 miles to the north-westward of Lady bay is composed of moderately high sand-hummocks, partly covered with brushwood, with a few bare sand-patches, which show very conspicuously when seen from seaward, forming a great contrast with the coast farther to the westward, which consists of low grass-hummocks.

TOWER HILL, which stands to the westward of some high table land, N.E., 8 miles from Saddle hill, is of a conical shape, and may be seen at a distance of 16 or 18 miles, in moderately clear weather. The table land round Tower hill has been cleared of much of its timber, which makes some large trees that have been left standing very conspicuous. The hill itself has also been cleared of the bushy trees which made it heretofore so remarkable, and a beacon has been erected on the summit.

LADY BAY is an indentation of the main-land extending from its rocky western point E. $\frac{1}{4}$ N., $1\frac{3}{4}$ miles to Hopkins river, from which Hopkins reef projects one-third of a mile to the southward, and has breakers on it, when there is any swell from seaward. The land in the immediate vicinity of the bay is composed of sand-hummocks, without timber, very low to the N.W., but gradually rising eastward to a high bluff, which forms the west head of Hopkins river. Behind Lady bay it is high and well wooded, while the land to the eastward of Hopkins river is clear of timber and grassy, rising gradually from the shore eastward of the river, and terminating in a high grassy down, at $1\frac{1}{2}$ miles from the coast.*

The western part of Lady bay, in which is the anchorage, is protected from the S.W. by three small islands; the anchorage is also in some degree sheltered from south-westerly gales by detached reefs, extending to the south-eastward of the islets.

MIDDLE ISLE, the central and largest of the three islets, which form the south-western limit of Lady bay, is 250 yards long, N.W. and S.E., and about 100 yards broad, with its centre lying S.S.E. $\frac{1}{2}$ E. $1\frac{2}{3}$ cables' lengths from the west point of the bay.

LIGHT.—There is a fixed light on the centre of Middle isle 78 feet high, and visible at the distance of 13 miles.

The westernmost islet of the group lies close to the north-westward of Middle isle, and both are situated on a shoal projecting nearly two-thirds of a mile southward and eastward from the west point of the bay; the eastern portion of this shoal for a distance of 2 cables' lengths, forms a spit about 50 yards broad, and is separated by a narrow opening from a patch of foul ground nearly 2 cables in extent, lying S.E. by E. $\frac{1}{2}$ E. a quarter of a mile to nearly half a mile from the light-house.

The easternmost of the three islets lies about $1\frac{1}{2}$ cables' lengths to the eastward of the light on Middle isle, and on the southern end of a reef 2 cables long, North and South, and half a cable to 1 cable broad, leaving a space with 6 to 12 feet water between the west point of the bay and the islet, and 10 to 12 feet water between the islet and the narrow spit of the shoal which projects from Middle isle.

The BAR.—Lady bay is fronted to the south-eastward by a bar, extending from Hopkins reef above a mile in a S.W. and West direction to a 5-fathoms bank, which lies S.E. $\frac{1}{2}$ E. a little more than three-quarters of a mile from the light on Middle isle, and according to the Admiralty plan, has a patch of kelp close to the northward of it. The bar appears to be nearly a quarter of a mile broad, with 4 to 5 fathoms on it; but with a

* See Plan of Lady bay, No. 2,494; scale, $\frac{1}{2}$ inch = 6.5 inches.

heavy swell the sea breaks with great violence right across from Hopkins reef to the 5-fathoms bank, and for more than 2 miles out to sea.

THE SOUTH CHANNEL, which is the best entrance into Lady bay, leads between the 5-fathoms bank and the foul ground to the north-westward ; it is one-third of a mile wide, with 11 to 7 fathoms water.

Between the bar and about a quarter of a mile from the shore the soundings vary from 8 to 4 fathoms ; the bottom being apparently rock outside, and sand nearer the shore.

MOORINGS.—There are two moorings in the western part of Lady bay, one in $4\frac{1}{2}$ fathoms, consisting of an anchor of 37 cwt., with 90 fathoms of $1\frac{3}{4}$ -inch chain ; and the other, in 3 fathoms, being an anchor of 26 cwt., with 75 fathoms of $1\frac{3}{8}$ -inch chain : to the end of each chain is attached a barrel buoy.

MERRI RIVER, which flows into the sea on the east side of the west point of Lady bay, is barely 150 yards wide at the entrance, close off which are two detached rocks above water, and two others lie close within the north-eastern entrance point. At about one-third of a mile north-westward of the entrance a narrow channel branches off in an E.N.E. direction, one-third of a mile to Pertobe lagoon.

JETTY.—At about 100 yards North of the north-east entrance point of Merri river a jetty projects from the beach 200 yards in an E. by S. direction, at the end of which a light has been proposed. There is a flag-staff on the beach at 1 cable's length to the northward of the jetty, with several stores and other buildings near them. From the flag-staff the beach curves in an E.N.E. direction 6 cables' lengths to the harbour light, and for about a quarter of a mile westward of this light, a sand-spit projects a quarter of a mile from the shore.

HARBOUR LIGHT.—LIFE BOAT.—The former is a *red* fixed light, visible at the distance of 3 miles between the bearings of N.W. and N. $\frac{1}{4}$ E., and is intended to guide vessels in clear of the 5-fathoms bank and the south-east reef, or foul ground, which lies to the south-eastward of the three islets. This is also a life-boat station.

WARRNAMBOOL.—There are two obelisks bearing N. $\frac{1}{4}$ E., one distant 250, and the other 380 yards from the harbour light ; the latter obelisk and a flag-staff nearly 2 cables' lengths to the westward of it, stand on a ridge of hills, immediately behind which is the town of Warrnambool.

DIRECTIONS.—A stranger bound to Lady bay from the westward, will find no difficulty in making the port, if he sights cape Bridgewater or cape Nelson, and afterwards passes Percy isle, which lies in the direct track, nearly midway between the latter cape and Lady bay. Having arrived off the southern entrance of the bay, and brought the harbour

light in line with the obelisks, bearing N. $\frac{1}{4}$ E., steer in with these marks on, and anchor as most convenient, in the western part of Lady bay, to the north-eastward of the three islets; or make fast to either of the moorings. Or a vessel may steer N. $\frac{1}{2}$ W. for the upper flag-staff, which will also lead through the south channel, clear of the 5-fathoms bank and the south-east reef.

In working into Lady bay against a north-west wind, care must be taken not to stand too near Hopkins reef, to avoid which it is advisable to fetch as close as may be with safety, to the south-east reef before standing in on the port tack; vessels of moderate sailing qualities will then fetch to windward of the 5-fathoms bank, and in a tack or two gain the anchorage.

From Seaward and Eastward.—In making Lady bay from seaward a good look-out should be kept for Warrnambool hill, which bears nearly N.E. $\frac{1}{2}$ N., distant 17 miles from the anchorage, and when seen it may be recognized by its resemblance to a cock's comb, it being elongated, and covered on the top with large bushy trees, visible 16 or 18 miles off shore, in moderately clear weather. This and Tower hill to the westward of it, would guide a vessel near enough to the port for the islands and the clear land to the eastward of Hopkins river to be seen; when, if nearing the port from the eastward, it should be discovered that the sea is breaking on the bar across the south-east entrance of the bay, a vessel should haul off and stand to the westward until the coast in that direction be opened clear of the islands, and the harbour light and obelisks are brought in line, bearing N. $\frac{1}{4}$ E., or the upper flagstaff N. $\frac{1}{2}$ W., when proceed through the south channel as directed when entering from the westward.

REMARKS.—The remarkable nature of the coast from cape Bridgewater to Lady bay renders the navigation most simple; and another advantage is, that on the approach of a heavy south-west gale after making the land, with night coming on, Portland bay affords good shelter until the gale abates, and is easy of access to strangers. This is considered of great importance, as it would be dangerous to take Lady bay in a gale from S.W. or South, and it should on no account be attempted, as the sea breaks with great violence across the south-east entrance of the bay.

HOPKINS RIVER, is a fresh-water stream trending eastward from the entrance; there are two detached rocks above water, close off the western entrance bluff, and two others with a rocky ledge projecting a cable's length from them, lie close to the shore at a cable's length to the north-westward of the bluff.

CURDIE INLET.—The coast from Hopkins river extends S.E. by E. $\frac{1}{4}$ E. 15 miles, and from thence E. by S. $\frac{1}{4}$ S. 5 miles to

Curdie inlet, and is bold and free from reefs. The inlet appears to be a shallow opening trending 5 or 6 miles in a north-west direction.

From Curdie inlet the coast takes an E. by S. direction 15 miles to Ronald point, which appears to have a rock above water close off it ; this coast, which is slightly embayed, is intersected by several small rivers or creeks, and between 2 and 8 miles westward of Ronald point is closely fronted by the Sow and Pigs and other rocks above water. On the east side of Ronald point is the entrance of some openings or creeks, into which Gillibrand river flows from the eastward.

MOONLIGHT HEAD.—From the opening on the east side of Ronald point an apparently rocky coast trends S.E. by E. $5\frac{1}{2}$ miles to Moonlight head, which is about 200 feet high, and has a rock close off it. Immediately behind the head, and at about right angles with the coast, is a high well-wooded ridge trending far inland, and sloping down to the N.W. and S.E.

From Moonlight head the coast forms a bay extending E. by S. $\frac{1}{2}$ S. 14 miles to cape Otway, and is 3 miles deep ; for about 8 miles the coast is high and rocky, when it becomes lower, and is succeeded by a sandy beach several miles in extent, the land behind the beach being lower than that to the eastward or westward of it, and rising north-eastward into high and heavily timbered hills, which in clear weather, may be seen from seaward upwards of 50 miles off. At nearly midway is Joanna river, with an islet in its entrance ; and at 2 miles to the south-eastward of the islet is Castle cove, which appears to be fronted by rocks above water. Calder river flows into the sea at about $4\frac{1}{2}$ miles to the north-westward of cape Otway, and close off the west side of the entrance of the river are the Sentinel rocks, above water. From cape Otway to Limestone point, $1\frac{1}{2}$ miles to the north-westward of the cape, the shore appears to be bordered by sunken rocks.

According to M. Freycinet, some bold whitish cliffs project considerably from the line of coast at about W. by N. $\frac{1}{2}$ N. between 16 and 17 miles from cape Otway, with no dangers near them beyond $1\frac{1}{2}$ miles from the shore. This projection was also seen by Captain the Hon. R. S. Dundas in 1826, who describes the coast between it and cape Otway as high and bold, with several white patches, like sand, near the shore.

The coast between Portland bay and cape Otway was very indistinctly seen by Flinders in April 1802, to whose ship it was nearly proving fatal, as a lee shore in a south-west gale ; but the French ship *Géographe* coasted it, at 1 to 5 miles' distance, in the same month, and found no dangers extending more than a mile from the shore, except off the white

cliffs just mentioned, which in the French chart, are distinguished by the name of cape Volney.

CAPE OTWAY, the northern point of the western entrance of Bass strait, is a bluff cliffy projection 250 feet high, of a dark brown colour, with patches of coarse sandstone rising to openly timbered grassy hummocks, not exceeding 350 feet in height. A rocky ledge, with 10 feet water on its shoalest part, lies S.S.E. three-quarters of a mile from the cape; and a very heavy ripple extends nearly two miles from the shore, with the light-house bearing N. by E. to N.N.W. This ripple had, until sounded by the surveying officers, been looked upon as a dangerous reef, and is still thought to be so, a vessel having had a boat washed away when passing near it.

LIGHT.—A *white* circular light-house 52 feet high, and 300 feet above high-water level, stands on the southern extreme of cape Otway, in lat. $38^{\circ} 51' 45''$ S., long. $143^{\circ} 31' 10''$ E.; it exhibits a light *revolving* once in every 3 minutes with a bright flash once in every minute, and in clear weather, it is visible at the distance of 24 miles.

TELEGRAPH STATION.—On cape Otway there are also a telegraph station and flag-staff; the former is in hourly communication with the capitals of Victoria, South Australia, and Tasmania.

PORTS OF REFUGE.—The coast from Cape Leeuwin to the western entrance of Bass strait having been now described, it is important that the navigator who may be bound from Bass strait to the westward, should be made acquainted with the places which may be resorted to for shelter from contrary winds, and which are severally noticed in the preceding part of this volume.

There appears to be no good place of shelter between Bass strait and Kangaroo island, except Portland bay, but there are besides, various anchorages under that island, the bays and coves at the entrance of Spencer gulf; and farther to the westward, Coffin and Streaky bays, Petrel bay, in the isle of St. Francis, and Fowler bay, S.S.E. 80 miles from the head of the Great Australian bight. Afterwards come Goose Island bay, Thistle cove, and the lee of Observatory isle, all in the archipelago of the Recherche. Thistle cove cannot be entered in a gale, but when once secured in the south-west corner, a vessel will be safe. The other two places afford very indifferent shelter from strong winds; and are, indeed, with the exception of the first, scarcely fit for a temporary anchorage in moderate weather.

Anchorage and perfect shelter from all westerly winds is also probably to be found in the sandy bight round the north side of Malcolm point, and in the bight to the eastward of Lucky bay; though neither of these bays is known to have been entered by shipping, and the latter is both difficult and dangerous of access.

Doubtful Island bay, Port Two People, and King George sound, afford complete shelter against all westerly gales ; but some little time would be lost in getting out of them, as well as out of the two bights last mentioned, if a vessel waited till the wind changed round to the eastward. Port Augusta, on the east side of cape Leeuwin, also affords shelter from westerly gales.

Respecting places of shelter from easterly winds, the latter seldom acquire sufficient strength and durability on this coast to oblige a vessel to seek for such ; but in doing so under any of the numerous headlands which afford it, care must be taken to avoid anchoring too near the shore, or in any position from which a vessel could not readily be extricated on the appearance of a change from the westward.

The BAROMETER will be found a valuable companion on this coast, as may be seen by reference to pages 495-497 and 499.

CHAPTER IV.

AUSTRALIA.—SOUTH COAST, CAPE OTWAY TO PORT
PHILLIP, BEGINNING WITH WESTERN ENTRANCE
OF BASS STRAIT.

VARIATION, from 8° to 10° East, in 1868.

SINCE the discovery of Bass strait by an enterprising gentleman of that name, in an open whale boat from Port Jackson in 1798, it has been much used by vessels navigating to and from that port, and is found a very safe and generally much shorter route than round southward of Tasmania.*

BASS STRAIT, which separates the South coast of Australia from Tasmania, is about 200 miles long, nearly East and West, and 120 miles wide. The western end between cape Otway and cape Grim, the north-west extreme of Tasmania, is 120 miles wide, but King island, which lies midway, occupies nearly 36 miles of this space, having the Safest entrance, 47 miles wide, to the north-westward, and another entrance, 37 miles wide, to the south-eastward of the island; the latter entrance, however, being much impeded by numerous dangers, is only recommended to the general navigator in cases of emergency.

The eastern entrance of Bass strait is still more crowded with islands and rocks, more than 50 miles of the southern portion of the entrance being occupied by Flinders and Barren islands, and the latter being separated from the north-east extremity of Tasmania by Banks strait.

As the northern portion of Bass strait contains the approach to Port Phillip and the most frequented route between the southern and eastern coasts of Australia, the navigator's attention will be first directed to this portion of the strait, together with the coast from cape Otway to Gabo isle, near Cape Howe, including Port Phillip; the southern portion, with the north coast of Tasmania, being subsequently described in chapters V. and VI.

KING ISLAND, of which the northern end forms the south-east side of the northern and Safest entrance into Bass strait from the westward, is 36 miles long, North and South, and 13 miles broad at the centre, with a round hill 595 feet high, on cape Wickham, its northern extremity, which

* See Charts of Bass strait, sheets 1 and 2, Nos. 1,695 and 1,695 A; scale, $m = 0.20$ of an inch.

is in lat. $39^{\circ} 35' 20''$ S., long. $143^{\circ} 57' 10''$ E., and which bear S.E. by S., distant 48 miles from cape Otway.

LIGHT.—There is a *white* circular light-house on cape Wickham, 145 feet high, exhibiting a *white* fixed light 230 feet above the mean sea level, visible in clear weather, at a distance of 24 miles, when bearing from N.N.E. $\frac{1}{2}$ E. round by East to W.N.W.

CAUTION.—The attention of mariners is called to the following extract from the report of the Light-house Commissioners appointed by the Governments of New South Wales, Victoria, South Australia, and Tasmania :—“ In advising the erection of a light-house on King island, the Commissioners wish to guard themselves from affording the public any reasonable supposition that this light can be at all considered in the position of a great highway light for the navigation of Bass strait. The south coast of New Holland, at the western end of the strait, being free from danger, affords in their opinion the safest route for the prudent mariner to approach, and they conceive that the light on King island is only to be regarded as a *beacon* for warning navigators of danger, rather than as a leading light to a great thoroughfare.”

HARBINGER ROCKS, to the W.N.W. of cape Wickham, are two granite boulders, with deep water between them. From the N.E. rock, which is scarcely awash, Cape Wickham light-house bears S.E. by E. $\frac{1}{4}$ E., distant $3\frac{3}{4}$ miles, and from the other, which uncovers a few feet only, E. by S., $\frac{1}{4}$ S. $4\frac{1}{2}$ miles. It is said the schooner *Cumberland* found not less than 9 fathoms water between these rocks and the island.

NAVARINE ROCK, another sunken danger, lies N.N.E., $2\frac{1}{2}$ miles from Cape Wickham light-house. Captain Stokes observes, that the great depth in the immediate vicinity of these rocks gives no warning of their proximity in the night, or during thick weather.

FRANKLIN ROAD and NEW YEAR ISLES.—On the north-west side of King island is a sandy bay about 6 miles broad, which affords good anchorage and shelter from easterly winds, in 12 to 20 fathoms water. New Year isles, which are two in number, with some small rocks and breakers about them, lie nearly S.W. by S., 8 miles from Cape Wickham light-house ; and as they front the western part of the bay, they serve to break off the long swell which almost constantly rolls in upon this coast from the south-westward. Franklin road is the name given to the anchorage on the east side of these isles.

There is a narrow passage between the two isles, but none between them and the southern point of the bay. The channel round their north

side has a clear space of more than 4 miles, and 23 fathoms water within half a mile of the Harbinger rocks. The latter should, however, not be approached very closely, as strong tide streams run near them and the north-west part of King island, and in no certain direction.

TIDES.—It is high water in Franklin road, full and change, at 1 o'clock; the south-west stream commences $3\frac{1}{2}$ hours before high water, or at 9 h. 30 m.

The western shore of King island is described by Captain Stokes as being a low, treacherous, and rocky coast. Rocks were discovered by him lying $1\frac{1}{2}$ miles from the shore, at about 11 miles to the southward of New Year isles; and Captain Lewis, harbour-master at Port Phillip, discovered a very dangerous rock nearly level with the sea at low water, lying in a doubtful position, about S.S.W., 12 miles from New Year isles and 7 miles from the shore, with the tide sometimes breaking over it, at high water; inshore of it there are 46 to 7 fathoms.

FITZMAURICE BAY and STOKES POINT.—Fitzmaurice bay, on the western side, and distant about 8 miles from the southern extremity of King island, affords good anchorage in easterly winds. There are some rocks near the shore between 2 and 6 miles northward of the bay. A long dark line of black cliffs stretches southward, from near the bay to about 3 miles from the south point of the island, where the ground sinks suddenly; vessels are therefore apt to be misled, and to suppose that the island ends there, whilst in reality it stretches out 3 miles farther, terminating in Stokes point, which is low, dangerous, and rocky, with breakers upon it. Close about Stokes point are some rocks, and at N.E. $\frac{3}{4}$ E. $1\frac{1}{4}$ miles from it, is Seal rock, above water; between these rocks is a clear channel with 16 fathoms water.

A rock awash, is shown on the Admiralty chart of Bass strait, in a doubtful position about W. $\frac{3}{4}$ S. 11 miles from Stokes point.

SEAL BAY, on the south-east side of King island, is a sandy bight extending N.E. by N. nearly 4 miles from Stokes point, and is about $1\frac{1}{2}$ miles deep. It affords shelter during northerly winds, in 8 to 12 fathoms, loose ground; but ought to be left when the wind reaches as far as West, as a strong breeze from anything to the southward of that point renders the anchorage unsafe.

The colonial brig *Lady Nelson* anchored for a night in Seal bay, in $8\frac{1}{2}$ fathoms, coarse sandy bottom, with the north-east entrance point bearing E.N.E., and the reef off its low rocky south-west point S. by E. A reef projects from the north-eastern point; but in every part of the bay where a vessel would be likely to anchor, there were 14 to 7 fathoms water, over coarse sand of a loose nature.

BRIG ROCK, so named from its resemblance to a brig, lies E.N.E. $3\frac{1}{4}$ miles from the north-eastern point of Seal bay. There are depths of 18 and 20 fathoms at 1 and 2 miles to the southward of this and another rock near it, and no hidden dangers are laid down in their vicinity ; but the shore abreast is fronted by small rocks, and should not be closely approached on account of the southerly swell, which usually breaks heavily upon them, and would place a vessel in an unpleasant situation should the wind fail.

SEA ELEPHANT BAY and ROCKS.—From abreast of Brig rock, the eastern coast of King island—here bordered with rocks—trends N.E. $\frac{1}{4}$ N. 5 miles, and from thence North 7 miles to the south point of Sea Elephant bay, which extends $5\frac{1}{2}$ miles, N. by W. and S. by E., but is not more than 1 mile deep. There are 5 fathoms water within half a mile of all parts of its sandy beach, with nearly the same depth between its north point and Sea Elephant rocks, 1 mile to the eastward of it, which consist of a small high lump, and a rock, awash, nearly 1 mile to the northward of it.

The soundings off Sea Elephant bay are very irregular : within a few hundred yards to the eastward of Sea Elephant rocks there are 10 fathoms, whilst there are 6 fathoms at nearly 6 miles farther off, and 16 to 31 fathoms at 15 miles to the N.E. and eastward ; the bottom being sand and shells, sometimes mixed with gravel. There are 12 fathoms abreast of the middle of the bay, at 3 miles from the beach ; and at twice that distance the French vessels found less than 7 fathoms, with 26 fathoms at about a mile farther to the S.E. These inequalities in the ground are very perceptible in rough weather, by the agitation of the sea above them, which during an easterly gale must almost break. There is, however, no danger to be apprehended near them in moderate weather ; and with the prospect of a fresh breeze from the eastward no vessel should attempt to lie in this bay.

ANCHORAGE.—Sea Elephant bay affords ample shelter from westerly winds, on good holding-ground of sand and shells, the best anchorage with those winds being in 9 or 10 fathoms, at about $1\frac{1}{2}$ miles from the beach near the middle of the bay, in a line between its south point and Sea Elephant rocks, where there is nothing in the way to prevent a vessel getting to sea immediately on the appearance of a fresh breeze from the eastward. In leaving this bay for the northward, care should be taken to avoid a detached reef lying N. by W. $\frac{3}{4}$ W. 8 miles from the Sea Elephant rocks and upwards of half a mile from the shore.

Wood and Water.—Sea Elephant bay has been much frequented by the colonists for the purpose of killing the sea elephant and other animals, but of late years their numbers have greatly decreased, and from some of the islands in Bass strait they have entirely disappeared. The shores of the bay, nevertheless, afford abundance of fire-wood and good water.

TIDES.—High water takes place in Sea Elephant bay, full and change,

at 3 h. 30 m.; rise 12 feet : the flood stream sets to the northward $1\frac{1}{2}$ knots, and the ebb in the opposite direction with the same velocity.

From Sea Elephant bay the east coast of King island extends N. by W. $\frac{1}{4}$ W. $9\frac{1}{2}$ miles, and from thence the north-east coast of the island trends N.W. by W. $\frac{1}{2}$ W. about the same distance to cape Wickham. There are 10 to 15 and 9 fathoms within half a mile of the shore from Sea Elephant rocks to cape Wickham, apparently without any other detached danger than the reef already noticed, 8 or 9 miles northward of Sea Elephant rocks, and some rocks near the shore, within 4 miles of cape Wickham. There is a remarkable sand-patch at about 7 miles south-eastward of the cape.

THE SOUNDINGS across the Safest entrance into Bass strait from the westward, are somewhat deep and irregular, there being 80 fathoms at S. $\frac{1}{2}$ E. 18 miles, and 25 fathoms at S.E. by S. 16 miles from cape Otway; but the soundings over the greater portion of this entrance generally range from 45 to 60 fathoms, over a bottom of sand and shells.

PARKER RIVER.—From cape Otway the coast trends E. by N. $\frac{1}{2}$ N. $2\frac{1}{4}$ miles to Franklin point, which is low and sandy, with some rocks lying near it. At three quarters of a mile northward of this point is the mouth of the small river Parker, at which the Victorian end of the Tasmanian electric cable is secured, and where the light-house stores are landed. As there is usually a heavy surf at the mouth of the river, it is dangerous to attempt a landing there.

From Parker river the coast trends nearly N.E. $\frac{1}{4}$ N. 42 miles to Addis point, and begins with high dark-coloured cliffs, backed by densely wooded hills, rising to the height of 2,297 feet, at N.N.E. $\frac{3}{4}$ E. 25 miles from cape Otway, and extending to within five miles of Addis point. At about eight miles north-eastward of Addis point the coast changes to sand-hummocks, backed by undulating hills, with patches of wood, and farm-houses. From Blanket bay, a small bight $1\frac{1}{2}$ miles N.E. by N. of Parker river, the coast trends N.E. by N. and East 4 miles to Storm point, and from thence N.N.E. $\frac{1}{4}$ E. $2\frac{1}{4}$ miles to Bunbury point. A reef, just above high water, projects half a mile from the shore between the two points.

HENTY REEF, N.E. $\frac{3}{4}$ E. $9\frac{3}{4}$ miles from Cape Otway light-house, is a dangerous rock, with 18 feet water over it, on which the sea breaks heavily in bad weather. It is steep-to, with 8 to 10 fathoms all round within a cable's length of its shoalest part.

BEACONS.—The position of Henty reef is shown by the intersection of two lines drawn through four pillar-beacons on the main-land, each surmounted by a ball; two of them, which stand East and West 200 yards from each other, with the inshore one painted *white*, and the outer *black*, being N.E. by N. two-thirds of a mile from Storm point; the other two

beacons bearing S.E. and N.W. from each other, the inshore one painted *white*, and the outer *red*, being on Bunbury point.

DIRECTIONS.—If bound to the N.E., the *black* beacon on Storm point must be kept well open northward of the *white* one, until the *white* beacon on Bunbury point opens well to the north-eastward of the *red* beacon. In proceeding to the S.W., keep the outer or *red* beacon on Bunbury point, well open southward of the *white* one, until the *white* beacon on Storm point is well open south-westward of the *black* beacon.

APOLLO BAY, on the north-east side of Bunbury point, lies just under a high part of the Otway range, and may also be known by the beacons on the point, and the few houses at the northern part of the bay.

CAPE PATTON, N.E. $\frac{1}{2}$ E. $8\frac{1}{2}$ miles from Bunbury point, is a bold dark-looking wooded head, at S.W. $1\frac{1}{2}$ miles from which, a 2 to 3-fathoms shoal projects half a mile from the shore : and at N.E. $\frac{1}{4}$ N. $1\frac{1}{2}$ miles from the cape, a 12-foot spit extends half a mile from Hawdon point.

LOUTIT BAY.—From this point the coast extends N.N.E. $\frac{3}{4}$ E. 9 miles to Grey point, a low grassy projection, with a reef extending half a mile from it, and forming the south side of Loutit bay, which may be recognized by a square land-mark, 30 feet high, surmounted by a staff and ball, and erected on the adjacent coast range.

ANCHORAGE, in 4 or 5 fathoms, may be obtained in Apollo and Loutit bays, but the latter is much the best, as, even in fair weather, there is a heavy swell in Apollo bay. Sailing vessels anchoring in either bay, with westerly gales, must prepare for a change of wind, as it oftens chops round to South, and sometimes to S.E.

SPLIT POINT, N.E. $\frac{1}{4}$ N. 7 miles from Grey point, is of a reddish brown colour, and appears like three cliffs close together, divided by dark ravines. Eagle Nest reef, which is awash, projects half a mile from the shore at two thirds of a mile N.E. of Split point.

DEMONS BAY.—Between this reef and Addis point, at N.E. $\frac{1}{2}$ E. $7\frac{1}{2}$ miles from it, the coast forms two bights, separated by Roadnight point, the north-eastern being Demons bay. At N. by E. one mile from the point is a creek, with a sunken rock close off it, between which and Addis point, there are two rocks above water.

ZEALEY POINT.—From Addis point the coast trends N.E. $\frac{1}{4}$ N. 5 miles to Zealey point, from whence it curves N.E. and East $9\frac{1}{2}$ miles to Barwon head.

VICTORIA REEF, on which there are 15 feet of water, lies E. by N. $\frac{3}{4}$ N. $1\frac{1}{4}$ miles from Zealey point, with which it is connected by a bank, that continues along the coast to Barwon head ; at midway, it only extends a quarter of a mile from the shore. Ant spit, on which there are 12 feet water, projects from this bank to $2\frac{3}{4}$ miles W. by S. of the head.

BARWON HEAD is a saddle-shaped scrubby hummock 122 feet high, appearing from seaward like an island, on account of the low land in its rear. This head forms the south side of Barwon river, which boats can only enter with very smooth water. On the northern bank of this river, at about 10 miles to the north-westward of its mouth, is situated the important town of Geelong.*

CHARLEMONT REEF, S.W. by W. 1 mile from Barwon head, is a detached 9-foot patch, with deep water about it.

From Barwon river a continuation of the low sandy shore curves eastward nearly 6 miles to point Lonsdale, which forms the outer western entrance point of Port Phillip. A spit, having 12 to 15 feet water on it, projects 1 mile eastward from the mouth of the river, from whence a continuous rocky shoal, nearly half a mile broad, with 6 to 16 feet water on it, extends to point Lonsdale. From the edge of this shoal to $3\frac{1}{2}$ miles off shore the soundings gradually increase to 28 and 30 fathoms.

PORT PHILLIP, which includes the ports of Melbourne, the metropolis of the colony of Victoria, and of Geelong, a town of almost equal commercial importance, is situated at the head of an extensive bight between cape Otway and Wilson promontory, 130 miles to the eastward of the cape. In approaching the port from the westward, the entrance is not easily distinguished until Nepean point, the eastern entrance head, bears N.N.E., when Shortland bluff, on which the highest and leading light-houses are erected, shows out, and the estuary becomes visible. If Barwon head is previously seen, the entrance of Port Phillip is easily found by its relative position with that head.†

Port Phillip extends about 32 miles, North and South, and is 18 miles wide, exclusive of an arm which trends 16 miles in a W.S.W. direction to Geelong, the port being capable of receiving and sheltering a larger number of ships than ever went to sea; but the entrance is less than 2 miles wide, and nearly one half of it is occupied by rocks and shoals.

POINT LONSDALE, the western head of the entrance to Port Phillip, is low and juts out from a dark rocky cliff, it being neither so high nor so well marked in outline as Nepean point, the eastern head; but can now be easily distinguished by a light and look-out house, a telegraph station, a tidal flag-staff, and a *red* beacon, near its south-east extremity.

LONSDALE REEF, the greater part of which dries at low water, projects a quarter of a mile south-eastward from Point Lonsdale, and is about 1 cable broad, with dangerous rocky patches extending nearly 2

* See Chart of Port Phillip, Southern Sheet, No. 1,171A; scale, $m = 1$ inch.

† See Plan: Entrance to Port Phillip, No. 2,747; scale, $m = 3$ inches.

cables' lengths farther to the south-eastward, with 5 fathoms water close outside them.

LIGHT.—The temporary light on Point Lonsdale was, on and after the 25th of February 1867, superseded by a light of the same character, but of more power and range: this light will be visible 10 miles off, in ordinary weather. It exhibits a fixed *green* and *red* light. The *green* light is visible to seaward when bearing about N. by W. to N.W. $\frac{1}{2}$ W., and the *red* towards Nepean point, and the harbour when bearing N.W. $\frac{1}{2}$ W. to W. by S.*

Vessels having the *green* light in sight will be outside, and with the *red* in sight, inside the Lonsdale and Lightning rocks, which bear S.E. $\frac{1}{2}$ E., distant respectively nearly two thirds of a mile and $1\frac{1}{10}$ miles from the light. The blending of the two colours when seen from a vessel, will show that she is in the vicinity of, or in line with these dangers; great caution will therefore be necessary *before* these colours begin to blend.

PILOTS.—There is a most efficient pilot establishment at Port Phillip heads; the vessels are fore-and-aft schooners and cutter-rigged, painted a light stone colour, each with her number on her main-sail. They cruise from 3 to 12 miles outside the heads, borrowing on either shore according to the weather; and one of them is constantly outside when there is a possibility of keeping the sea. The pilot-vessels carry at the main mast-head by day, a *red* and *white* flag in horizontal stripes, and between sunset and sun-rise exhibit a bright light at the fore mast-head, and show in the waist a flash-light every half hour.

Signals.—Vessels steering for Port Phillip are bound to show the usual signal for a pilot when within 12 miles of the entrance, and if the pilot-vessel be in sight, they must allow a reasonable time for a pilot to board. Vessels which miss the pilot-vessel will be boarded by a pilot from a whale-boat, when they are inside point Lonsdale. But no stranger should attempt to enter without taking a pilot; although the channels are so carefully lighted and buoyed, that it is quite possible to do so.

Vessels which are exempt from pilotage must, on arriving within 12 miles of the entrance, have a large *white* flag flying at the main mast-head until past Swan point, 6 miles within the entrance, under a heavy penalty, to prevent the pilots' time being unnecessarily taken up running after vessels which do not require their services.

TIDAL SIGNALS are shown at point Lonsdale, denoting the quarter of the tide with reference to the stream: in the middle of the entrance between Lonsdale and Nepean points the period of slack water is very limited. The stream turns from two to three hours after high and low water by the shore.

* From the Victoria Government Gazette of the 19th of February 1867.

The Flood, during the first quarter is denoted by a blue flag half mast.

„ „ second quarter „ at mast-head.

„ „ third quarter „ red flag half mast.

„ „ fourth quarter „ at mast-head.

Ebb.—The same signals are used for the four quarters of the ebb ; with a ball below the flag.

By attention to these signals a ship-master will know the true state of the tide, which cannot be always ascertained by the usual process of finding the time of high water, the strength and duration of the tide being so much influenced by the wind and weather.

The signal-keeper has instructions, if he sees vessels approaching the heads and running into danger, to warn them by means of Marryat's signals ; strangers should therefore watch these signals.

NEPEAN POINT.—The eastern head of the entrance to Port Phillip is the narrow western termination of a peninsula, which extends 15 miles in a westerly direction from Arthur's Seat, and consists of a series of sand-hummocks slightly covered with low bushes, and having a *white* beacon on its extremity.

NEPEAN REEF and ROCK.—Nepean reef projects West nearly 2 cables' lengths from Nepean point to Nepean rock, a small islet, on which is a *red* cone-shaped beacon ; from thence a continuation of the reef and several pinnacle rocks outside it, extend $3\frac{1}{2}$ cables' lengths farther westward to Corsair rock, at 150 feet to the N.N.E. of which is a small detached rock with 10 feet water on it. Nepean reef dries at low water out to the islet, but the remainder of the reef is covered with 1 to 3 feet water.

The northern edge of the rocky ledge along Nepean reef trends from Corsair rock E. by N. to 1 cable's length northward of Nepean point. The coast outside Nepean point is bordered by a continuation of this reef and numerous rocks ; but they do not extend more than 1 to $1\frac{1}{2}$ miles from the shore, which may be approached to a quarter of a mile in 5 fathoms.

CORSAIR ROCK, which may be considered as the outer end of Nepean reef, is 20 feet in diameter, having 11 feet water over it with 4, 5, and 6 fathoms close to ; this rock lies with the *red* beacon on the rocky islet in line with the *white* beacon on Nepean point, bearing East, the *red* beacon distant $3\frac{1}{2}$ cables' lengths.

ENTRANCE.—LONSDALE and LIGHTNING ROCKS.—The entrance to Port Phillip, between Lonsdale and Nepean points is $1\frac{1}{4}$ miles wide, but the navigable channel is contracted to a little less than 1 mile in width between the reefs that project from Lonsdale and Nepean points. Lons-

dale and Lightning rocks, with 3 fathoms least water over them, are the shoalest heads of a rocky bank with $5\frac{1}{2}$ to 7 and 9 fathoms on it, extending $1\frac{1}{2}$ miles in a S.E. by E. direction from point Lonsdale, and stretching completely across the entrance.

Lonsdale rock, S.E. $\frac{1}{2}$ E. a little more than half a mile from point Lonsdale, lies in the western limit of the fair way, and Lightning rock W. by S. $\frac{1}{2}$ S. 1 mile from Nepean point, lies 3 cables' lengths to the eastward of the fair way mark through the entrance, leaving a clear channel 4 cables wide over the bank between the rocks, with $5\frac{1}{2}$ fathoms close to Lonsdale rock and 7 to 9 fathoms in mid channel, and close to Lightning rock. At E.S.E., 2 cables' lengths from this rock is a rocky patch about 30 yards in extent, with 29 feet water on it, and 6 to 8 fathoms close to it.

CAUTION.—Outside the bank there are 9 to 15, and inside 10 to 49 fathoms. This great inequality, with tide streams at times running 5 to 7 knots, causes the well-known Race, or "*Rip*," between Port Phillip heads, which during, or immediately after a south-westerly gale, breaks so furiously as to be dangerous to small vessels. In 1866, the Hydrographic Office gave notice that a ship drawing over 21 feet, had recently touched on a rock, in entering the port, with a fresh breeze. Several rocks, some with only 24 feet water on them, have since been found by sweeping in the Race, and others may yet be discovered.

TO CLEAR LONSDALE REEF.—Vessels drawing less than 14 feet may, in the day time, pass between Lonsdale reef and rock by keeping Swan point just open East of Shortland bluff, bearing N.E.

Swan beacon touching the cliff at Shortland bluff, bearing N.E. $\frac{1}{2}$ N., leads half a cable's length to the eastward of Lonsdale rock.

LEADING MARKS.—The two light-houses on Shortland bluff in line, N.E. by N., lead in the fair way through the entrance into Port Phillip.

TO CLEAR LIGHTNING ROCKS.—The Lightning rocks are cleared to the northward and southward by keeping Point Lonsdale mast open on either side of Point Lonsdale telegraph-house, which is *white*, with a slate roof; and the *red* obelisk on Shortland bluff touching the east side of the high light-house, bearing nearly N.E. by N., clears them to the westward.

TO CLEAR CORSAIR ROCK.—The Corsair rock, off Nepean point, is cleared by keeping the low light-house on Shortland bluff in line with the east end of the light-keepers houses, near the high light-house N.N.E. $\frac{1}{4}$ E., until the *white* beacon on point Nepean is well open to the northward of the *red* beacon, when going in, or well open to the southward, when going out.

The western shore of Port Phillip from point Lonsdale curves northward and eastward, forming a bay which extends from the point N.E. by E. $2\frac{1}{2}$ miles to the south extreme of Shortland bluff, and is

three-quarters of a mile deep ; but it is mostly occupied by shoals with very irregular soundings between them, extending from the shore to a line from point Lonsdale to Shortland bluff; the only part of the bay which appears free from shoals and has tolerably regular soundings, is within about 1 mile of Shortland bluff; but even here no anchorage is recommended.

At three-quarters of a mile to the northward of point Lonsdale is a cemetery, near the shore, from which a low coast-range extends to Shortland bluff. The electric telegraph passes close along the shore, and behind the coast range from point Lonsdale to Shortland bluff.

VICTORY SHOAL lies nearly in the centre of the bay, its outer edge, on which there are 11 to 14 feet water, being in line between point Lonsdale and Shortland bluff; the least depth of water on the shoal is about 6 feet, or, according to Mr. Ferguson, 4 feet, equi-distant from the point and bluff, and 4 cables' lengths from the shore.

TO CLEAR VICTORY SHOAL.—Keep Swan Spit light-house open East of Shortland bluff, the former bearing about N.E. $\frac{3}{4}$ E.

SHORTLAND BLUFF, on which are two light-houses and a *red* obelisk, with the township of Queenscliff in their rear, is the south-east extreme of a peninsula projecting nearly two miles in a north-easterly direction from the line of coast, from which it is separated by an isthmus little more than 1 cable broad. The peninsula is about half a mile broad at Shortland bluff, from whence it gradually contracts to the north-eastward, where it terminates in a low narrow point.

LIGHTS.—The high light-house on Shortland bluff, which bears N.E. $\frac{3}{4}$ E., distant $2\frac{1}{2}$ miles from point Lonsdale, is a tower 68 feet high, built of blue stone, which retains its natural colour. It exhibits a fixed *white* light 130 feet above the sea level, and is visible from seaward, on any bearing between *about* E. by N.E. and North at the distance of 17 miles, in clear weather; but when close in with Lonsdale land it will only be seen when bearing between N.E. by E. and North. Within Port Phillip heads the light will be visible when bearing from N.E. by E. round by North and West, to S.W. by W.

Low Light.—The low light-house tower, which is painted *white*, stands S.W. by S. 352 yards from the high light-house, and at the height of 90 feet above high-water level, exhibits a fixed *red* and *white* light, showing *white* when bearing from about N.E. by E. to N.E., *red* from N.E. to N.N.E. and *white* from N.N.E. round by North, to W. by N. The *white* light should be seen in clear weather, at a distance of 14 miles, and the *red* at 10 miles.

Vessels entering between Port Phillip heads should keep the *red light* in sight, and steer in with it bearing N.E. by N., and in line with the

high *white* light. The change of colour from *red* to *white* indicates an approach to the Lonsdale reef on the west, and Nepean reef on the east side of the entrance.

The *white* light between the bearings of N.E. by E. and N.E. shows over the dangers extending from point Lonsdale. Between the bearings of N.N.E. to W. by N. the *white* light shows over the Corsair rock to a line from the low light-house along the north side of, and through the South channel, passing to the southward of Pope's Eye *red* buoy, along the *black* buoys, and to the northward of the *white* buoys, which mark the north and south sides of the channel, so that vessels during night, with light winds or adverse tide streams, will be aided by a bearing of the light.

QUEENSCLIFF JETTY and LIGHT.—LIFE BOAT STATION.—At N.N.E. nearly half a mile from the high light-house, Queenscliff jetty projects about 130 yards from the shore, and has a fixed *green* light at its end, visible at a distance of 4 miles; this is also a life-boat station.

SWAN ISLAND, which is low, and has several small lagoons, is separated from the north-east point of the Shortland peninsula by a shallow opening 100 yards wide, communicating with Swan bay to the westward. From this opening, the south side of Swan island trends nearly E.N.E. $1\frac{1}{3}$ miles, and from thence the eastern end sweeps three-quarters of a mile northward, round Swan point, to the north-east extreme of the island. Swan island is nearly 2 miles long, E.N.E. and W.S.W., and 1 mile across at its broadest part; but it is nearly divided in two by a bight, with a small islet in it, on its northern side. There are three islets close to the south-west extreme, and another close to the north point of Swan island.

SWAN BEACON, which, when touching the cliff at Shortland bluff, leads clear of Lonsdale rock, is *white* with a *red* top, and is situated near the south-east extreme of the island, the high light-house on Shortland bluff bearing nearly S.W. $\frac{3}{4}$ S., distant a little less than 2 miles.

Between Shortland bluff and the south-east extreme of Swan island the shores form a bay extending 2 miles, N.E. and S.W., and is half a mile deep; but it is fronted by a bank having irregular depths of 6 to 14 feet water on it, the outer edge of which, from $1\frac{1}{2}$ cables' lengths off Shortland bluff, trends nearly N.E. $\frac{3}{4}$ E. $1\frac{1}{4}$ miles to *black* buoy No. 1, and from thence half a mile farther in the same direction to Swan Spit light.

At nearly E. by N., a little more than half a mile from Queenscliff jetty is a rock on the bank, with only 7 feet water over it.

CLEARING MARKS.—To clear the edge of the bank and the 7-feet rock just noticed, keep Lonsdale light-house open of Shortland bluff.

ANCHORAGE.—The only anchorage recommended off Shortland bluff is in 6 to 8 fathoms off Queenscliff, at about three-quarters of a mile from the shore. Abreast and below the light-houses the ground is rocky; it is not free from stones at any place, but its general nature is sand and shell.

SWAN SPIT LIGHT-HOUSE is a wooden building, erected upon piles, on the south-eastern edge of the shoal-bank just noticed, and bears E.S.E., distant two-thirds of a mile from Swan beacon. It is painted *red*, and exhibits fixed *red* and *white* lights, visible at the distance of 8 miles, showing *white* when bearing from about E.N.E. to N.E. $\frac{1}{2}$ E, *red* from from N.E. $\frac{1}{2}$ E. to N.E. $\frac{3}{4}$ N., *white* from N.E. $\frac{3}{4}$ N. to N. by W. $\frac{1}{2}$ W., and *red* from N. by W. $\frac{1}{2}$ W. round by West to S. $\frac{1}{4}$ W. The *red* light in sight between the bearings of N.E. $\frac{1}{2}$ E., and N.E. $\frac{3}{4}$ N. indicates the entrance to the West channel between No. 1. *black* buoy and the *white* perch-buoy on the Royal George shoal.

Vessels must not approach within 60 fathoms of this light-house. A gong is sounded every 10 minutes in thick or foggy weather.

SWAN BAY is a large shallow lagoon, extending from the isthmus behind Queenscliff N.N.E. $5\frac{1}{4}$ miles, and $1\frac{1}{4}$ miles across, with an opening $1\frac{1}{4}$ miles wide, between Swan island and a narrow tongue of land projecting nearly $1\frac{1}{2}$ miles from the N.N.E., its extremity forming the northern entrance point of the bay.

From the north extreme of Swan island a mud-flat stretches nearly across the opening to Duck islet, between which and the northern entrance point is a narrow boat channel, having 6 to 14 feet water, marked by *white* beacons on the north-east side, and by a *black* beacon on the south-west side of the entrance; but a bank extends from the north-east extreme of Swan island to the northern entrance point, forming a 3-feet bar across the mouth of the boat channel.

The eastern side and southern part of Swan bay are mostly occupied by mud-flats, leaving only portions of the western shore accessible even to boats; there being generally not more than 2 to 5 feet water in the bay.

The western shore of Port Phillip from the northern entrance point of Swan bay extends nearly N. by E. $2\frac{1}{4}$ miles to South Red bluff, and from thence about three-quarters of a mile farther in the same direction, to a point, close to the northward of which St. Leonard's jetty projects into about 8 or 9 feet water. A continuation of the bank which stretches northward from Swan island borders this shore, from which it projects 1 to $1\frac{1}{2}$ cables' lengths, with 2 to 6 feet water on it. The 8-fathoms edge of the shoal water, which extends about one-third of a mile from the shore, between the entrance of Swan bay and the point

of St. Leonards forms the northern portion of the west side of Coles channel.*

POINT GEORGE.—From the point of St. Leonard's the shore, after extending N by W. $\frac{1}{2}$ W. $1\frac{1}{4}$ miles to North Red bluff, trends N.N.E. one third of a mile to Indented head, from whence it recedes in a N.W. $\frac{1}{2}$ N. direction $1\frac{1}{4}$ miles to point George, close to the northward of which is White Woman's rock. From the point of St. Leonard's to point George a shoal, with 2 to 3 feet water on it, borders the shore, from which it extends about 1 to $1\frac{1}{2}$ cables' lengths.

GOVERNORS REEF is a patch, with 1 foot water on it, marked by a beacon, from which North Red cliff bears W. by N. $\frac{1}{4}$ N., distant nearly two-thirds of a mile. At about one-third of a mile to the north-westward of the beacon, and E.S.E. nearly a quarter of a mile from Indented head, is another patch, which dries.

PRINCE GEORGE BANK.—From half a mile off the point of St. Leonards the 3-fathoms edge of the shoal water, which extends from the shore, trends in a N. by E. direction to two *black* buoys, which mark the edge of the bank, and lie respectively S.E. by E., and E.N.E., each distant half a mile from the beacon, just noticed. From the northern of these two buoys the eastern 3-fathoms edge of the bank extends irregularly, in a N. by W. direction $2\frac{1}{2}$ miles to the north-east extreme of Prince George bank; at a quarter of a mile off which is moored a *black* buoy in 6 fathom water, bearing N.E. $\frac{1}{4}$ N., distant $2\frac{1}{4}$ miles from point George.

From the north-east extreme of Prince George bank, its northern edge, after trending half a mile to the north-westward, extends with a slight southerly curve, 3 miles in a W. by S. direction, to a quarter of a mile off the shore to the westward. There are two 4-feet patches on the northern edge of the bank nearly in line with the *black* buoy, bearing E. by N. $\frac{3}{4}$ N., from which one patch is distant two-thirds of a mile, and the other $1\frac{1}{2}$ miles.

The SOUTHERN SHORE of Port Phillip from point Nepean to Observatory point, E. $\frac{1}{4}$ S. $1\frac{1}{4}$ miles from it, forms a bight a quarter of a mile deep; but the depth of water in it does not exceed 17 feet, and there are numerous sunken patches: the 3-fathoms edge of this shallow water and foul ground extends from the shore to a cable's length outside the line of the points of the bay.

OBSERVATORY POINT and SANITARY STATION.—There is a flag-staff on Observatory point, which marks the western boundary of the

* See Chart of Port Phillip, Northern Sheet, No. 1,171B; scale $m = 1$ inch.

Sanitary station, and from this flag-staff the shore extends E. by S. $\frac{3}{4}$ S. nearly $1\frac{1}{2}$ miles to another flag-staff at the eastern boundary of the station.

From the eastern flag-staff the shore trends in an E. $\frac{1}{2}$ S. direction, $1\frac{3}{4}$ miles to point King. On the east side of the flag-staff there is a small bight from which a shoal spit projects one-third of a mile, but between the two flag-staffs the shore may be approached to 1 cable's length, in 7 and 8 fathoms, and between the shoal spit and point King, within a quarter of a mile, in 6 and 7 fathoms.*

THE QUARANTINE GROUND extends along the shore between Observatory point and point King, the anchorage being in 8 and 9 fathoms at 1 mile from the shore. Strangers who through stress of weather, bring up here, or at the anchorage off Shortland bluff, should not attempt to proceed above these anchorages without a pilot, as a collection of banks, with somewhat intricate channels, extends 8 miles in all directions above these anchorages.

NICHOLSON'S KNOLL is a sand ridge near the Quarantine ground about 1 cable's length in extent, North and South, with 3 fathoms water over it and 5, 6, and 7 fathoms close to. It is marked by a *black* and *white* checkered buoy, moored on the centre of the knoll, from which the flag-staff at the east end of the Sanitary station bears S. by W. $\frac{3}{4}$ W., and the high light-house nearly N.W. by W. $\frac{1}{2}$ W.

CLEARING MARKS.—To pass to the northward of Nicholson knoll, keep point Nepean *red* beacon a little open North of the point. To pass to the southward of the knoll, shut the *red* beacon in with point Nepean. When the eastern flag-staff of the Sanitary station bears S.W. by S., a vessel will be above the knoll.

From point King the southern shore of Port Phillip curves S.E. $\frac{1}{4}$ E. about $1\frac{3}{4}$ miles to the Two Sisters, a double point from the east side of which the coast, after trending E. by S. $\frac{3}{4}$ S. $2\frac{1}{2}$ miles to White cliff, takes an E. by N. $\frac{3}{4}$ N. direction for $6\frac{1}{2}$ miles to the foot of Arthur's Seat.

The land from point Nepean to White cliff has hills 100 to 225 feet high scattered over it, with numerous lime kilns, wells, and some ponds. Between White cliff and Arthur's Seat the country is flat, and at 3 miles to the eastward of the cliff it appears to be swampy, with a creek intersecting the shore midway between White cliff and Arthur's Seat.

From point King to White cliff the coast is fronted by a bank mostly of sand with weeds, extending, midway, $2\frac{1}{2}$ miles from the shore. This bank has generally 8 to 10 feet water upon it, with some small hollows of

* See Chart of Port Phillip, Southern Sheet, No. 1,171A; scale, $\pi = 1$ inch.

deeper water, and numerous knolls, on some of which there are only 3 to 6 feet water. Between the south-east extreme of this bank and White cliff is the entrance of an inlet one quarter to half a mile wide, with 4 to 9 fathoms water, trending along shore towards point King, and nearly separating the bank from the shore.

The western spit of the bank is marked by No. 2 *white* buoy bearing N.N.W., distant three-quarters of a mile from point King; and between them a bight, having 6 to 3 fathoms, trends 1 mile eastward into the bank. From No. 2 *white* buoy the northern edge of the bank extends E. $\frac{1}{4}$ N. $1\frac{3}{4}$ miles to No. 4 *white* buoy, and from thence E. $\frac{1}{4}$ S. $1\frac{1}{4}$ miles to No. 6 *white* buoy, moored close to the north-east extreme of the bank, from which its eastern edge sweeps round in a S.E. by S. direction $1\frac{3}{4}$ miles to about N. by W. three-quarters of a mile from White cliff.

Two other banks extend together, 2 miles eastward from the large one, from which they are separated by a narrow channel 1 mile long, with $3\frac{1}{4}$ to 8 fathoms in it. These two banks are divided by a narrow channel three-quarters of a mile long, N.W. and S.E., having 5 to 4 fathoms water. The northern edge of the easternmost and smallest bank is marked by No. 8 *white* buoy, bearing nearly E. $\frac{3}{4}$ S. distant $1\frac{3}{4}$ miles from No. 6 *white* buoy. From the easternmost bank a spit, with $3\frac{3}{4}$ fathoms on it, projects E. $\frac{1}{2}$ N. about three-quarters of a mile to No. 10 *white*, or Capel Sound buoy, which bears nearly East, distant 1 mile from No. 8 *white* buoy.

CAPEL SOUND is a clear space 2 miles long, East and West, and $1\frac{1}{2}$ miles wide, bounded to the northward by the two easternmost banks just described; and to the southward by the coast extending eastward from White cliff. There are regular soundings in 6 to 8 fathoms throughout the greater portion of the sound, over a bottom of sand and shells and mud; but shoal water extends a quarter of a mile to one-third of a mile from the southern shore.

ANCHORAGE.—Vessels bound up, and caught in South channel by a northerly or north-west gale, will find anchorage in 5 to 7 fathoms in Capel sound, with White cliff bearing S.W. and the top of Arthur's Seat East; but, if daylight permit, it would be better to run back to the anchorage off Shortland Bluff light-houses.

From Capel sound to Arthur's Seat the shore continues bordered by a shoal one-third of a mile broad, the soundings increasing from 3 fathoms at the edge of the shoal to 7 fathoms at $1\frac{1}{2}$ miles from the shore, over a bottom of sand and shells.

ENTRANCE BANKS and CHANNELS.—For the first $2\frac{1}{2}$ miles within the heads the estuary is free from dangers, but above that distance, where it widens between North and East, it is crowded with sand-banks, radiating nearly 8 miles from their southern and western extremes. Between these

banks there are several channels, three only being buoyed, namely, the South, West, and Coles channels ; the others are narrow and intricate.

SOUTH CHANNEL.—The South, or great ship channel, is bounded to the southward by the northern edge of the three banks last described, along which are moored the 5 *white* buoys, marked with even numbers, from 2 to 10 inclusive, the easternmost—Capel Sound buoy—being surmounted by a staff and ball. The channel is bounded on the north side by the southern edge of Great sand and Middle ground, defined by 8 *black* buoys, marked with odd numbers, from 1 to 15 inclusive, the first and last being each surmounted by a staff and ball.

From No. 1 *black* buoy Observatory point flag-staff bears S.W. $\frac{3}{4}$ W., and the high light-house on Shortland bluff W. by N. $\frac{1}{4}$ N. From this buoy No. 15 *black* buoy bears E. $\frac{1}{2}$ S., distant 9 miles, the respective distances between the intermediate buoys varying from nearly 2 miles between Nos. 3 and 5, to 1 mile between Nos. 11 and 13. From No. 1 the buoys are nearly in line to No. 13, bearing E. $\frac{3}{4}$ S. ; but from No. 13, No. 15 *black* perch buoy bears E. by N. $\frac{1}{2}$ N., distant about 1 mile.

South channel is 1 mile wide at its western entrance, between No. 2 *white* buoy and No. 3 *black* buoy, and half a mile wide abreast of No. 6 *white* buoy ; but only a quarter of a mile wide at its eastern entrance, between No. 10 *white* perch buoy and No. 11 *black* buoy. The soundings in the channel are very irregular, varying from 13 fathoms in the middle of the western entrance to 20 fathoms at $1\frac{1}{2}$ miles farther to the eastward : from thence the depth varies from 11 to 16 fathoms between No. 4 *white* and No. 5 *black* buoys ; the soundings then gradually decrease eastward to a little more than 4 fathoms in the eastern entrance, between No. 10 *white* perch and No. 11 *black* buoys.

The flood stream sets through South channel 1 to $1\frac{1}{4}$ knots, and the ebb three-quarters of a knot to 2 knots.

MIDDLE GROUND.—The southern edge of this bank extends $5\frac{3}{4}$ miles from No. 15 to No. 5 *black* buoys, and from the latter buoy the north-western edge of the bank, which forms the south-east side of Pinnacle channel, takes a general N.E. direction $2\frac{1}{2}$ miles, and from thence the north-eastern edge curves $4\frac{3}{4}$ miles south-eastward to No. 15 *black* perch buoy, where the bank terminates in a narrow point.

Between Nos. 7 and 9 *black* buoys an inlet, having nearly $3\frac{1}{4}$ to $4\frac{1}{2}$ fathoms, trends 1 mile in a N.E. by E. direction, nearly dividing Middle ground into two banks. The north-western and north-eastern sides have similar inlets, with $3\frac{1}{2}$ to 4 fathoms water. The general depth of water on Middle ground varies from 9 to 12 feet ; but there are several ridges and knolls on it with only 2 and 3 feet water over them.

PINNACE CHANNEL, which is only suitable for small vessels of light draught, is merely an inlet from the north-eastward, between Middle ground and Great sand, extending S.W. by S. $2\frac{1}{2}$ miles, nearly to No. 5 *black* buoy, where the only entrance to the channel in that direction, is over the narrow 10-foot ridge which connects Middle ground with Great sand. The channel is three-quarters of a mile to a quarter of a mile wide, having $3\frac{1}{2}$ to 4 fathoms, with three banks in it, on which there are less than 3 fathoms water.

GREAT SAND.—From No. 5 *black* buoy the eastern 3-fathoms edge of Great sand sweeps round N.N.E., North, and N.N.W. 5 miles to a narrow spit, forming the north-eastern point of the sand and the south-west point of the north-east entrance into Symonds channel. The southern 3-fathoms edge of Great sand extends from No. 5 *black* buoy nearly W. by N. $\frac{1}{4}$ N. $3\frac{1}{4}$ miles to the south-west point, close off which lies No. 1 *black* perch buoy. From the south-west point of Great sand its north-western 3-fathoms edge, which forms the south-eastern side of Symonds channel, trends N.E. by N. 5 miles, and from thence E. by N. three quarters of a mile to the north-eastern point of the sand.

MUD ISLES.—The main body of Great sand forms a flat $4\frac{1}{2}$ miles long, N.E. by N. and S.W. by S., and extends from its north-western 3-fathoms edge $2\frac{1}{4}$ miles across towards Pinnacle channel. The depth of water on this flat is very uniform, rarely being more than 5 feet, nor less than 1 foot. Mud isles, which are three in number, and on the centre of Great sand, are low and wooded, and are situated on a bank about 1 mile in extent, enclosing a small lagoon, having about 6 inches water in it. There is a narrow hollow 1 mile long, N.E. and S.W., with 8 to 20 feet water, close to the north-west side of the isles, and there are several knolls on the flat to the northward and southward of them.

POPE'S EYE SHOAL, which forms the north-west side of the south-west entrance of Symonds channel, is a bank of sand 1 mile long, N.E. and S.W., and about 2 cables broad, with 3 to 5 feet water on its shoalest part, which rises to a ridge 4 cables long, its centre bearing S. by E. $\frac{1}{2}$ E., distant $1\frac{1}{10}$ miles from Swan Spit light-house. The south-west edge of the shallow water extending from Pope's Eye shoal is marked by a *red* buoy, moored in about 4 fathoms, with the high light-house on Shortland bluff bearing W. by N. $\frac{1}{4}$ N. distant $1\frac{4}{10}$ miles; there is an 18-foot knoll at 1 cable's length to the south-eastward of the buoy.

CLEARING MARK.—To pass to the westward of the south-west extreme of Pope's Eye shoal, Swan Spit light-house must not be brought to the northward of N. by E. $\frac{1}{2}$ E.

WEST MIDDLE SAND extends from Pope's Eye shoal about $5\frac{1}{2}$ miles in a N.E. direction, between Symonds and Lœlia channels. The south-eastern 3-fathoms edge of the sand, which forms the north-west side of Symonds channel, trends from Pope's Eye shoal, E. by N. half a mile and N.N.E. 2 miles, from whence it takes a N.E. by E. direction 2 miles, and after a turn of a quarter of a mile to the southward, the edge of the sand extends 1 mile eastward to its east extreme, on which is a bank with 5 and 6 feet water over it, its south-east point being marked by a beacon, from which the high light-house on Shortland bluff bears nearly S.W. by W. $\frac{1}{4}$ W. and Arthur's Seat S.E. $\frac{1}{2}$ E. At about half a mile to the westward of the beacon a spit, with 16 feet water on it, projects south-westward one-third of a mile from West Middle sand into the entrance of Symonds channel.

The north-western 3-fathoms edge of West Middle sand, which forms the south-eastern side of Lœlia channel, from Pope's Eye shoal, trends W.N.W. 4 cables lengths, and then about N.E. by N. $1\frac{1}{4}$ miles, where it forms a spit, between which and the sand to the eastward of it—which for the distance of 2 miles is only a quarter of a mile across—an inlet, one quarter of a mile wide at its entrance, and having 4 and 5 fathoms water, runs in S. by W. three-quarters of a mile. From the bight of this inlet the north-western edge of West Middle sand extends N.N.E. 3 miles, when, after trending E. by N. half a mile, the edge of the bank resumes its N.N.E. direction 1 mile to its north extreme.

Between the north and east points of West Middle sand, which bear N.W. by W. $\frac{1}{2}$ W. and S.E. by E. $\frac{1}{2}$ E., distant a little more than 2 miles from each other, an inlet, having $2\frac{1}{4}$ to $4\frac{1}{2}$ fathoms, trends $2\frac{1}{2}$ miles south-westward, nearly dividing the north-eastern portion of the sand into two separate banks. The south-eastern of these two banks rises to a narrow ridge, with only 1 to 3 feet water on it, extending from half a mile W.N.W. to nearly $2\frac{1}{2}$ miles W.S.W. from the beacon. There are two ridges, with 2 to 6 feet water over them, on the north-western of the two banks; and there is another ridge about 1 mile long, with 1 to 6 feet water over it, on the middle of West Middle sand, at 1 mile to the south-westward of which there is a bank with 3 to 5 feet water over it, with Swan Spit light-house bearing W. by S., distant $1\frac{1}{2}$ miles.

SYMONDS CHANNEL, is a little more than 1 mile wide at its south-western entrance, between No. 1 *black* perch buoy and Pope's Eye buoy, from whence the channel extends 6 miles in a north-easterly direction, and is two thirds of a mile to 1 mile wide, until within $1\frac{1}{2}$ miles of the beacon, where detached banks with 16 and 17 feet water on them, so encumber the channel, that at half a mile south-westward of the beacon there is only a width of about $1\frac{1}{2}$ cables with 17 or 18 feet water.

There is a knoll with 16 feet water on it, on the south-east side of

Symonds channel at nearly $1\frac{1}{2}$ miles from No. 1 *black* perch buoy, and another, having 17 feet water on it, nearly in mid-channel at about 2 miles south-westward of the beacon; but, with these exceptions, there are generally 9 to $5\frac{1}{2}$ fathoms from the south-west entrance to within $1\frac{1}{2}$ miles of the beacon. Symonds channel may be made available in northerly or north-west winds, when unable to fetch through West channel; but it is not recommended for any other than small vessels, until it is buoyed.

ROYAL GEORGE SAND, which forms the south-east side of the entrance of West channel, and lies midway between Pope's Eye shoal and the bank, extending from Shortland bluff to Swan Spit light-house, is $4\frac{1}{2}$ cables long, East and West, with 11 feet least water on it. Each end of the sand is marked by a *white* buoy, moored in 16 feet water, which lie E. by N. and W. by S. $4\frac{1}{2}$ cables' lengths from each other. From No. 2, the western of the two buoys, and which is distinguished by a staff and ball, Queens-cliff jetty light bears W. $\frac{1}{2}$ S. and Swan Spit light-house N.E. by N.

The south-west entrance of West channel, between Royal George sand and the bank to the north-westward of it, is nearly one quarter of a mile wide with 5 fathoms water. The channel between the east extreme of Royal George sand and the south-west spit of West Middle sand is about the same width as the south-western entrance of West channel, but it has only 18 and 19 feet water in the centre and western part.

CLEARING MARK.—To clear Royal George sand on the western side keep Swan Spit light-house to the eastward of N.E. by N., until Queens-cliff jetty light bears W. by S.

WILLIAM SAND, which forms the north-western side of Lœlia channel, and the south-eastern side of West channel, is 4 miles long from S.W. by S. to N.E. by N., and a quarter of a mile to half a mile broad within its 3-fathoms edges, its south-west extreme, which is marked by No. 6 *white* buoy, bearing N.E., distant three-quarters of a mile from Swan Spit light-house. From a quarter of a mile within its south-west extreme to about three-quarters of a mile within its north-east spit, William sand rises to a narrow ridge with 1 to 5 feet water over it.

WANDSWORTH BEACON is situated on the south-western part of the ridge of William sand, and bears N.E. $\frac{1}{2}$ E., distant $1\frac{1}{4}$ miles from Swan Spit light-house.

LÆLIA CHANNEL extends from the south-western part of West channel 4 miles in a N.E. direction, between West Middle and William sands; its south-west entrance, between Wandsworth beacon and the spit which projects northward from West Middle sand, is $1\frac{1}{2}$ cables wide with $3\frac{1}{4}$ fathoms water; but from thence the channel increases to 3 and 4 cables in width, with $3\frac{1}{2}$ to 5 fathoms, until within one-third of a mile

of its north-east entrance, which is only $1\frac{1}{2}$ cables wide, with $3\frac{1}{2}$ fathoms water.

WEST CHANNEL, which is most used, extends from Royal George sand 5 miles in a N.N.E. direction, and is $1\frac{1}{2}$ cables to half a mile wide, with 5 to nearly $3\frac{1}{4}$ and $5\frac{1}{2}$ fathoms water, over an even bottom of sand and shells. This channel is distinguished by Swan Spit light-house, in the south-west, and by West Channel light-vessel, in the north-eastern entrance, the sides being marked by thirteen buoys, of which eight are painted *white*, with even numbers, on the south-eastern side, and five painted *black*, with odd numbers, on the north-western side.

The south-eastern side of West channel, after passing Royal George sand, is formed by the south-west extreme of West Middle sand and the north-western edge of William sand, which are marked by *white* buoys with even numbers.

No. 4 *white* buoy is moored in $4\frac{1}{2}$ fathoms, at 1 cable's length to the northward of the south-west spit of West Middle sand, and S.S.E. $\frac{1}{2}$ E. $4\frac{1}{2}$ cables' lengths from Swan Spit light-house. No. 6 marks the south-west spit of William sand, and bears N.E., distant three-quarters of a mile from Swan Spit light-house. Nos. 8, 10, and 12 buoys are moored along the north-western 3-fathoms edge of William sand, in line with, and bearing N.N.E. from No. 6 buoy, from which they are distant, respectively, 4 cables' lengths, and $1\frac{1}{4}$ and $2\frac{1}{4}$ miles. No. 12 is surmounted by a staff and ball. No. 14 buoy, which is also moored on the north-western 3-fathoms edge, and No. 16 on the north east extreme of William sand, lie respectively N.E. nearly 1 mile, and N.E. $\frac{1}{4}$ E. $1\frac{1}{2}$ miles from No. 12 buoy.

West channel is bounded on the north-west side by the bank which extends from Swan island, and is marked by No. 1 *black* buoy and Swan Spit light-house; and from thence by the irregular 3-fathoms edge of shoals extending $4\frac{1}{2}$ miles in a N.N.E. direction.

Between Swan Spit light-house and No. 3 *black* buoy, which lies N.N.E. $1\frac{1}{3}$ miles from it, the 3-fathoms edge of the shoal is intersected by two inlets, having nearly $3\frac{1}{2}$ to 4 fathoms water in them. One of these inlets trends W. by N. $\frac{1}{2}$ N. about a quarter of a mile towards the eastern extreme of Swan island, and the other, about half a mile farther to the northward, trends nearly N. by W. $\frac{3}{4}$ W. three-quarters of a mile into Coles channel.

From No. 3 *black* buoy, which is situated nearly 1 cable's length within the 3-fathoms edge of the shoal, a spit projects 4 cables' lengths in a N.E. by N. direction. The south-east elbow of this spit approaches so near William sand as to contract this part of the channel to a width of only $1\frac{1}{2}$ cables, with barely $3\frac{1}{4}$ fathoms water, this being the narrowest and shoalest part of West channel.

From a small inlet on the west side of this spit, the 3-fathoms edge of the shoal trends N. by W. half a mile to the entrance of a narrow inlet having $3\frac{1}{2}$ to 4 fathoms water, extending S. by W. and N. $\frac{1}{2}$ E. half a mile each way from its entrance. The northern side of the entrance to this inlet is marked by No. 5 *black* buoy, from whence the 3-fathoms edge of the shoal extends N.N.E. $\frac{3}{4}$ E. $1\frac{1}{2}$ miles to No. 7 *black* buoy, and then N.E. $\frac{1}{4}$ N. a little more than three quarters of a mile to No. 9 *black* buoy, which is moored near the north-east extreme of the shoals, and marks the north-western side of the north-east entrance of West channel.

WEST CHANNEL LIGHT-VESSEL is moored in 3 fathoms, at about 2 cables' lengths to the southward of No. 9 *black* buoy, with the high light-house on Shortland bluff bearing S.W. $\frac{3}{4}$ S. and Arthur's Seat S.E. $\frac{3}{4}$ E. This light-vessel, which is painted *red*, has three masts, with a ball at the fore and main, and shows two fixed lights 24 feet apart, at an elevation of 50 feet, visible at the distance of 8 or 10 miles. A gong is sounded every five minutes during foggy weather. Should the light-vessel break adrift, two *red* lights will be exhibited till she is replaced in her position.

There is a bank, with 16 and 17 feet water on it, close to the southward of the light-vessel; but, with this exception, there appear to be no other detached shoals in any part of West channel.

From Royal George sand to No. 6 *white* buoy, on the south-west spit of William sand, a distance of $1\frac{1}{4}$ miles, West channel is half a mile wide, with $3\frac{1}{2}$ to 5 fathoms water; but from No. 6 to No. 10 *white* buoy, the width of the channel varies from 2 to $4\frac{1}{2}$ and $1\frac{1}{2}$ cables, with $4\frac{1}{2}$ to nearly $3\frac{1}{4}$ fathoms water. From No. 10 buoy the channel again increases to half a mile in width, with nearly $3\frac{1}{4}$ to $4\frac{1}{2}$ fathoms. The water shoals suddenly towards the north-western and south-eastern sides, throughout the greater part of the channel.

WEST SAND.—The bank which forms the western side of West channel rises to several narrow ridges, with 2 to 5 feet water over them. West sand, the longest of these ridges, from two-thirds of a mile N.N.W. $\frac{1}{2}$ W. of No. 3 *black* buoy extends N. $\frac{3}{4}$ E. $1\frac{3}{4}$ miles, and is 1 to 2 cables broad, with a narrow spit returning three-quarters of a mile in S. by E. direction from the northern end of the sand. A narrow ridge, with 3 to 6 feet water on it, lies between $1\frac{1}{2}$ and 6 cables' lengths southward of West sand; and two others, each half a mile long, nearly N.E. and S.W., lie between West sand and the north-east extreme of the bank on which these ridges are situated; the south-east edge of the north-eastern of these two ridges is about 100 yards within No. 7 *black* buoy.

From the northern end of West sand, the bank with 10 to 17 feet water over it, extends N. by E. 1 mile, to a sand-head, between which and that

marked by No. 9 *black* buoy, North of West Channel light-vessel, a bight two-thirds of a mile wide, with 5 to $3\frac{1}{4}$ fathoms water, trends nearly three-quarters of a mile south-westward into the bank.

CLEARING MARKS.—Station peak, a mountain 1,132 feet high, on the north-west side of Port Phillip, in line with the north-east extreme of point George, bearing nearly N.W. by W. $\frac{1}{2}$ W., clears the north-east extreme of all the entrance banks, at a distance of $1\frac{1}{4}$ miles from the most projecting point.

COLES CHANNEL, between West channel and the western shore of Port Phillip, is a 2-fathoms passage used by small vessels acquainted with the locality. It is bounded on the east side by the bank which forms the western side of West channel; the shoalest parts of the bank being West sand and the narrow ridge to the southward of it. This side of the channel is marked by two *red* buoys, the southern bearing N. $\frac{1}{4}$ E., distant nearly 2 miles from Swan Spit light-house, and the northern N. by E. $1\frac{3}{4}$ miles from the southern buoy.

The western side of Coles channel is formed by the shoal extending northward from the east end of Swan island and along the western shore, noticed at page 216. The channel is a quarter of a mile to half a mile wide, with 3 to 4 fathoms in its northern and southern entrances, but only 2 to 3 fathoms in its central and widest part; the water shoals suddenly towards West sand, but gradually towards the shore. In the south-eastern entrance is a wreck, marked by a buoy at a little to the northward of midway between Swan Spit light-house and the southern *red* buoy.

ARTHUR'S SEAT, E. by S. nearly 15 miles from Shortland bluff, and in lat. $38^{\circ} 21' 20''$ S., long. $144^{\circ} 57' 10''$ E., is so named from its supposed resemblance to a hill of that name near Edinburgh: it is a conspicuous bluff 975 feet high, sloping down to the S.E., and is visible nearly 40 miles at sea. From the southward its north-west extreme appears precipitous, and being the highest land on the coast, is a remarkable object by which to distinguish the entrance to Port Phillip.

DROMANA BAY.—From the foot of Arthur's Seat the shore curves N.E., North, and N.W. 4 miles to Martha point: the north-eastern part of this bight forms Dromana bay, where there are 3 fathoms water at a quarter of a mile from the shore.

Water.—The land between Arthur's Seat and Martha point is low, with good spring-water near the shore, North of Arthur's Seat.

From Martha point, the shore, which may be approached to a quarter of a mile in 3 fathoms, trends nearly N.N.E. 2 miles to Martha cliff, which forms the south-west point of Balcolms bay. The land between the point and cliff rises to a ridge, of which the south-west, and highest part is

mount Martha, a hill 527 feet high, bearing N.N.E. $\frac{1}{2}$ E., distant $4\frac{1}{4}$ miles from Arthur's Seat.

BALCOLMS BAY extends from Martha cliff N. by E. $\frac{1}{4}$ E. nearly $3\frac{1}{4}$ miles to Fishermans point, but is barely two-thirds of a mile deep ; it may be approached to a quarter of a mile in 3 fathoms, but there are some rocks close along shore, of which Shag rock lies $1\frac{3}{4}$ miles north-eastward of Martha cliff; at three-quarters of a mile north-eastward of the cliff Balcolms creek communicates with the bay.

FISHERMANS BAY and MORNINGTON.—Fishermans bay, which is the water frontage of Mornington, is merely a slight indentation of the coast extending from Fishermans point N. by E. nearly 1 mile to Schnapper point. Shoals project a quarter of a mile from the southern quarter of the bay, but the shore to the northward of these shoals may be approached to a cable's length in 3 fathoms.

SCHNAPPER POINT and LIGHT.—The point projects a quarter of a mile from the line of coast, and has a small jetty for the convenience of the coasting trade. At the end of the jetty is a mast with a lamp 30 feet high, showing a *red* fixed light visible at a distance of 4 miles.

MOUNT ELIZA.—From Schnapper point the coast trends N.E. by N. 4 miles to Davy point ; it is slightly embayed, and is intersected by four small creeks, flowing north-westward from the hills at the back : the most conspicuous of these hills is mount Eliza, which bears N.N.E. $\frac{3}{4}$ E., distant $11\frac{1}{4}$ miles from Arthur's Seat. This coast may be approached within a quarter of a mile in 3 fathoms ; but the shore is rocky for about $1\frac{1}{2}$ miles southward from Davey point.*

FRANKSTON.—The coast from Davy point, after receding nearly half a mile to the eastward, extends N.E. $\frac{1}{2}$ N., $1\frac{1}{2}$ miles to the village of Frankston. The country behind is hilly, and is intersected by two or three small creeks. Between Davy point and Frankston a shoal, with 3 to 17 feet water on it, extends one-third of a mile from the shore ; and at a little more than half a mile N. by E. from the point a spit projects north-westward from the shoal to a rock with only $4\frac{1}{2}$ feet water on it.

The south-eastern shore of Port Phillip, which is mostly wooded, has several townships, and numerous houses and other buildings are scattered along it.

GARRUM SWAMP.—From Frankston a low uniform shore curves in a N. by W. $\frac{3}{4}$ W. direction $8\frac{1}{2}$ miles to the point of Mordialloc, and is separated by a narrow piece of wooded land from Garrum swamp, at the back of this coast. The shore from Frankston to the point of Mordialloc

* See Chart of Port Phillip, Northern Sheet, No. 1,171B ; scale, $m = 1$ inch.
14561.

may be approached to the distance of 3 cables' lengths in 3 fathoms ; but a ledge of rocks projects a quarter of a mile southward from the point.

From Mordialloc to Rickets point, W. by N. $2\frac{3}{4}$ miles from it, the coast forms a bay $2\frac{1}{2}$ miles across and three-quarters of a mile deep. From 4 and $4\frac{1}{2}$ fathoms in the entrance of this bay the water shoals to 3 fathoms at a quarter of a mile from the shore. Three patches, on the central and smallest of which there are only 6 feet water, lie W. by N. two-thirds of a mile, 1 mile and $1\frac{1}{2}$ miles from the eastern point of the bay.

RICKETS POINT.—From between Rickets point and the western point of the bay, just noticed, foul ground and shoal water project southward to 3 fathoms at half a mile from the shore.

PICNIC POINT.—From Ricket point a mostly rocky coast extends N.W. $\frac{3}{4}$ N. $3\frac{1}{4}$ miles to Picnic point. There are two intermediate projections, one at 1 mile and the other at nearly 2 miles from Ricket's point. Close to the southward of the former projection is Quiet Corner ; and between the latter and Red cliff, one-third of a mile to the northward of it, is Halfmoon bay. The coast between Rickets and Picnic points is bordered by foul ground and sunken patches, some with only 4 and 5 feet water on them, extending nearly half a mile from the shore. A spit projects S.W. from Picnic point to 3 fathoms at half a mile off.

ANONYMA SHOAL is a rocky patch one-third of a mile long, N.W. and S.E., and $1\frac{1}{2}$ cables broad, with 1 foot water on its shoalest part ; there are 4 fathoms at a cable's length from its outer edge, and $3\frac{1}{4}$ fathoms between it and a quarter of a mile off the beach. There is a *chequered* beacon on this shoal bearing S. by W., distant three-quarters of a mile from Picnic point and two-thirds of a mile from the shore.

From Picnic point to Green point, N.N.W. $\frac{3}{4}$ W. $1\frac{1}{2}$ miles from it, the coast forms a slight indentation, bordered by a shoal, of which the 3-fathoms' edge extends from half a mile off Picnic point, to 2 cables' lengths close to the southward of Green point.

A ROCKY PATCH, with $3\frac{1}{2}$ fathoms water over it, lies nearly West $1\frac{1}{2}$ miles from Picnic point ; there are 5 and $4\frac{1}{2}$ fathoms between this patch and the shore.

GREEN POINT appears to be most worthy of notice from its being at present, the southern terminus of the Brighton railway. Shoal water extends W.S.W. to 3 fathoms at half a mile from the point.

THE BRIGHTON RAILWAY runs from Green point about $4\frac{1}{2}$ miles to the northward, passing behind Brighton and St. Kilda, when, after a westerly curve of $1\frac{1}{4}$ miles round the north end of the latter town, it turns north-westward 3 miles to Melbourne.

From Green point the coast extends N. by W. $\frac{1}{4}$ W. $1\frac{1}{2}$ miles to point Cole, and from thence curves in a N.N.W. $\frac{1}{4}$ W. direction $1\frac{1}{4}$ miles to point Ormond, the eastern point of Hobson bay. For about 1 mile North from Green point the coast is bordered with rocks, and from half a mile off the point the 3-fathoms edge of the shoal water fronting the shore trends irregularly to one-third of a mile off point Cole, and then about N.W. $\frac{1}{2}$ N. to three-quarters of a mile off point Ormond.

BRIGHTON.—The southern and greater portion of the coast from about Green point to point Ormond forms the water frontage of the town of Brighton.

HOBSON BAY, the port of Melbourne, extends from point Ormond West $3\frac{1}{2}$ miles to point Gellibrand and is 2 miles deep ; but the western portion only is available for shipping, nearly all the eastern half of the bay being occupied by a shallow bank.*

From point Ormond the low eastern shore of Hobson bay trends N. by W. $\frac{1}{2}$ W. a little more than a mile to a jetty at the west point of the town of St. Kilda : the jetty projects from the shore 160 yards into 6 feet water. The 6-feet edge of the shoal which borders the shore, extends from a little more than a cable's length off point Ormond to about 30 yards within the outer end of the jetty. For about one-third of a mile northward from point Ormond there are numerous rocks scattered over the shoal.

The north-eastern shore of Hobson bay from about a quarter of a mile northward of the jetty of St. Kilda extends in a straight line N.W. by W. $\frac{3}{4}$ W. 2 miles to Sandridge pier. There are 9 feet water within a cable's length of the shore from the jetty to the pier.

SANDRIDGE PIER and LIGHT.—The pier projects from the south end of Sandridge, nearly S.W. by S. 530 yards, into 19 feet water. At the outer end of the pier is a *red* fixed light, visible at the distance of 2 miles. Four *red* buoys are moored in line along the south-east side, and three on the north-west side of the pier, from which the former are distant about 100 yards and the latter 70 yards.

RAILWAY PIER and LIGHT.—At W. by N. $\frac{1}{2}$ N. 3 cables' lengths from Sandridge pier the Melbourne and Hobson Bay Railway pier extends from the shore S. by W. $\frac{1}{2}$ W. 730 yards, into 21 feet water. At the outer extremity of the pier is a *green* fixed light, visible at the distance of 2 miles. There is a *black* buoy on either side of the pier, at about midway between its extremity and the shore ; that on the south-east side, in 20 feet water, being 70 yards, and the other, on a 17-feet spit projecting from the shore, being 170 yards from the pier.

* See Plan of Hobson bay and river Yarra, leading to Melbourne, No. 624 ; scale, *m* = 6 inches.

The MELBOURNE and HOBSON BAY RAILWAY runs N.E. 2 miles from the pier to the locality of the Custom House at Melbourne.

From the distance of 170 yards within the outer end of Sandridge pier the 3-fathoms edge of the bank between the two piers extends to about 1 cable's length off the inner end of the Railway pier; there being 21 to 20 feet water along the south-east side of this pier for a distance of 430 yards from its outer extremity.

From about 1 mile westward of point Ormond the 3-fathoms edge of the bank which fills the eastern half of Hobson bay extends N.W. $\frac{1}{2}$ W. $1\frac{1}{2}$ miles to its western elbow, which is marked by a *white* buoy, having a staff and ball. At N. by E. $\frac{1}{2}$ E. $3\frac{1}{2}$ cables' lengths from this is another *white* buoy close to the edge of the bank, with a 10-feet knoll at 1 cable's length to the southward of it. From the northern buoy the 3-fathoms edge of the bank trends N.N.E. $\frac{1}{2}$ E. $4\frac{1}{2}$ cables' lengths, and then nearly N.W. by N. one-third of a mile to about 130 yards within the end of Sandridge pier.

The depth of water on this bank gradually decreases from 18 feet at its edge to 10 and 12 feet at a quarter of a mile from the shore, over an even bottom of sand and shells.

The northern shore of Hobson bay from the Melbourne and Hobson bay Railway pier, trends W. by S. $1\frac{1}{4}$ miles to the northern side of the entrance of the river Yarra. The 6-feet edge of the shoal which borders the shore, extends from it 100 yards at the Railway pier to 300 yards from the northern side of the entrance of the river.

POINT GELLIBRAND.—From the southern extreme of point Gellibrand a low rocky shore trends N.E. nearly two-thirds of a mile to the east extreme of the point, the site of the old light-house, and is bordered by ledges of rocks, with spits of foul ground, which, midway, extend a quarter of a mile from the shore towards the light-vessel. These spits are enclosed by a shoal bank, the 3-fathoms edge of which, from 2 cables' lengths south-eastward of the south extreme of point Gellibrand trends E. by S. 2 cables' lengths, and N.E. by E. a quarter of a mile, to the south-east elbow of the bank, and from thence extends North two-thirds of a mile to 2 cables' lengths N.N.E. of the east extreme of point Gellibrand.

POINT GELLIBRAND LIGHT-VESSEL is moored in 5 fathoms, at S.S.E. 1 cable's length from the south-east elbow of the bank which projects from point Gellibrand, with the south extreme of the point bearing W. by N. $\frac{1}{4}$ N., and the site of the old light-house on the east extreme of the point, bearing N. by W. $\frac{1}{2}$ W. The vessel, which is painted *red*, has one mast and ball, and exhibits a *white* light 40 feet high, which flashes every half-minute, and is visible at the distance of 10 miles. A gong is sounded every ten minutes in foggy weather.

PIER.—From the east extreme of point Gellibrand a pier extends N.E. $\frac{1}{4}$ E. nearly 500 yards. From about 22 feet at the outer end of the pier, the depth of water on its north-west side decreases to 15 feet at 300 yards farther in towards the shore.

RAILWAY PIER.—From about 40 or 50 yards to the north-westward of the site of the old light-house on the east extreme of point Gellibrand, the Railway pier extends N. by E. $\frac{1}{2}$ E. about 600 yards into 20 feet water. Four *red* buoys are moored along the south-east side of the pier, from which they are distant about 50 yards : there are 18 feet water between the two inner, and 20 feet between the two outer buoys. The 3-fathoms edge of shoal water extends to about 40 yards within the outer end of the pier.

RAILWAYS.—Within the Railway pier is the southern terminus of the railway which curves westward and north-westward $2\frac{1}{4}$ miles to Geelong junction, passing through Williamstown and along behind North Williamstown. From Geelong junction the Geelong and Ballaarat railway branches to the westward ; and the Williamstown and Melbourne railway, $5\frac{1}{2}$ miles to the northward, eastward, and south-eastward, forming nearly a semi-circular curve to Melbourne, which is distant by rail, about 8 sea miles from Williamstown Railway pier.

PATENT SLIP.—Between 100 and 250 yards north-westward of the inner part of the Railway pier, a point projects N. by E. $1\frac{1}{2}$ cables' lengths, to a patent slip, at 100 yards off which are moored two *red* buoys, in about 17 feet water. From the west side of the point a jetty projects N. $\frac{1}{2}$ E. about 270 yards, into 13 feet water. Two *red* buoys are moored off the end of this jetty, one distant about 50, and the other 100 yards.

ST. ANN'S WHARF.—From the inner part of the point just mentioned, the shore curves north-westward about $1\frac{1}{2}$ cables' lengths to St. Ann's wharf, which projects from the shore N. by E. nearly 300 yards, into 9 feet water. A *black* buoy is moored in 11 feet water, at 160 yards off the end of the wharf.

PATENT SLIP.—At about 120 yards to the westward of St. Ann's pier is another patent slip running out in a N. by E. direction, with three *red* buoys moored off it, between 40 and 120 yards to the north-westward of the outer end of St. Ann's wharf. The two inner buoys are moored in 9 feet, and the outer one in 10 feet water.

OLD JETTY.—From this patent slip, the shore continues westward a little more than 1 cable's length, to the old jetty, which projects N. by E. 180 yards from the shore, into 4 or 5 feet water. At nearly midway between the inner patent slip and the old jetty a smaller jetty runs out about 120 yards from the shore.

. From about 100 yards westward of the old jetty the shore trends nearly N.N.W. 6 cables' lengths, to a small jetty projecting eastward about

100 yards from the shore, which here forms the southern side of the mouth of the river Yarra. The shore from the old jetty to about half a mile north-westward of the southern entrance point of the river forms the water frontage of North Williamstown. Between the old jetty and a smaller one, at about one-third of a mile to the north-westward of it, are several others, of which the longest does not appear to extend into more than 4 or 5 feet water.

Between the outer patent slip and half a mile to the westward of it, shoal water extends 1 to nearly $1\frac{1}{2}$ cables' lengths from the shore to the depth of 6 feet; and for a distance of 2 cables' lengths farther to the north-westward the shoal projects nearly a quarter of a mile from the shore, its outer 6-feet edge extending nearly in line with the outer end of St. Ann's wharf, bearing S.S.E. $\frac{1}{2}$ E. A beacon stands in 5 feet water, at about 60 yards within the outer edge of this projection of the shoal, with the outer end of St. Ann's wharf bearing S.E. $\frac{3}{4}$ S., distant 3 cables' lengths.

The north-western bight of Hobson bay is occupied by a bank extending across the entrance of the river Yarra, probably caused by the deposit from the river. The 3-fathoms edge of this bank, from about 80 yards within the end of the Williamstown Railway pier, extends N.N.W. and N. $\frac{1}{2}$ E. nearly 1 mile to a projection of the bank about $1\frac{1}{2}$ cables in extent, on which is a *black* perch buoy, bearing W. by S., distant $5\frac{1}{2}$ cables' lengths from the outer end of the Melbourne and Hobson bay Railway pier.

There are five *red* buoys, moored in 16 and 17 feet water, close round the *black* perch buoy. Between these buoys and the Melbourne and Hobson bay Railway pier, the 3-fathoms edge of the bank extends a quarter of a mile to nearly $1\frac{1}{2}$ cables' lengths from the shore.

A *black* cone-shaped buoy, surmounted by a staff and ball, is moored on the bank in 14 feet water, with the outer end of the Williamstown Railway pier bearing S.E. by S., distant 6 cables' lengths. At N. $\frac{1}{2}$ W. a quarter of a mile from this, is a *white* buoy, moored in 12 feet water; and between 2 and 3 cables' lengths farther in the same direction, there are four other *white* buoys, moored in about 10 and 11 feet water, in little more than the space of 1 cable's length. At $1\frac{1}{2}$ cables' lengths eastward of the outermost of these buoys, is moored a *red* buoy, in 16 feet water.

ANCHORAGE.—Between the banks which extend from the eastern and western shores of Hobson bay, there is a space of nearly 2 square miles, capable of affording shelter to upwards of 800 sail, in 3 to 5 fathoms water, with good holding-ground of mud. The bay is open to southerly gales, which send in sufficient sea to interrupt traffic; but small vessels can at all times find shelter off Williamstown.

THE RIVER YARRA is a narrow winding stream, in which, by dredging, a depth of not less than 11 feet in the channel is maintained to Melbourne. Although the mouth of the river is three-quarters of a mile wide, from N. $\frac{3}{4}$ E. to S. $\frac{3}{4}$ W., the shallow flat projecting half

a mile from the northern side, and the shoal water extending from the southern side of the mouth of the river, rendered it necessary to cut an entrance channel into the river, 60 yards wide, with 11 feet water. The *black* cone-shaped buoy, with the staff and ball, last noticed, kept in line with two *black* dolphins, each surmounted by a staff and ball, bearing W. by N. $\frac{1}{2}$ N., show the south side of the channel; the northern side being marked by *red* dolphins.

There is also a narrow passage, which leads into the river through the bank, at about 2 cables' lengths to the southward of the main channel. This passage from its entrance first trends S.W. $1\frac{1}{2}$ cables' lengths and then N.W. by N. nearly 3 cables' lengths, where it joins the northern channel: there is a *red* beacon on the east side of this passage, at about 150 yards to the southward of its junction with the northern channel.

From the junction of the two entrance channels the river Yarra trends between the flats, N.W. about half a mile, to abreast of Greenwich pier, which projects from the west bank of the river, 240 yards eastward, nearly to the navigable channel. The course of the river from Greenwich pier is N. by W. 1 mile, to a bight on the west side, forming the entrance to Stony creek. The river next trends N.E. half a mile, and then N. by W. nearly 1 mile to where it is joined by Saltwater river from the northward.

The channel of the river Yarra from its entrance to its junction with Saltwater river is 160 to 60 yards wide, with 13 to 8 feet water. The projecting parts of the banks of the channel are marked on the eastern side by *red*, and on the western side by *black* dolphins or beacons. The Yarra, from its junction with Saltwater river, trends 3 miles in an E. $\frac{1}{2}$ S. direction to Melbourne quay, near the bridge and Custom House, and is 50 to 90 yards wide, with 13 to 21 feet water. This part of the river winds between its steep banks, like a canal through the flat land, with no shoals on either side.

TIDES.—It is high water in the river Yarra, at Melbourne quay, full and change, at 2h. 48m.; springs rise 2 ft. 8 in., neaps 2 ft. The velocity of the stream of the Yarra depends on the rains that have fallen; but it generally runs down. Floods are not unfrequent, overflowing the banks and causing great destruction of property: that of December 1863 rose 7 feet above the mean level of the river, below the falls. Above these falls the rise was stated on that occasion to have been 30 feet, and in the gorges above Melbourne 50 feet.

The Tidal Signals for the River Yarra, hitherto hoisted at the fore mast-head of the water-police guard-ship, to show the depth of water in the new approach to the river, have been discontinued, and the height of the water in the Yarra is now shown by a self-acting tide-gauge erected on the outer *red* dolphin at the entrance of the river.

To assist persons on board vessels at a distance, in ascertaining the

height of water shown by the self-acting tide-gauge, six projecting arms are fixed on its south side, the upper edge of each arm coinciding with the lower part of each figure on the face of the tide-gauge which commences with the 10-feet mark. The top of the indicator as it is moved up and down by the tide, shows on the face of the gauge the height of the water over the shoalest part of the fairway.*

THE NORTH-WESTERN SHORE of Port Phillip, from the south extreme of point Gellibrand extends irregularly, W. by N. $1\frac{1}{4}$ miles, to a low rocky point, and from thence N.W. $\frac{1}{2}$ W. two-thirds of a mile to the entrance of Kororoit creek, which trends to the westward. The 3-fathoms edge of the foul rocky ground which borders the shore, projects 3 cables' lengths, except about midway between the two points, where there are 3 fathoms at $1\frac{1}{2}$ cables' lengths from the shore. A small rocky patch, at the extremity of a spit projecting 2 cables' lengths from the shore, lies E. by S. $\frac{1}{2}$ S. $4\frac{1}{2}$ cables' lengths from the low rocky point.

From Kororoit creek the shore trends S.W. by W. $1\frac{2}{3}$ miles to the point of Altona, and is also bordered by a rocky bank, with 7 to 18 feet water and shoal patches upon it. From the south point of this bank the south extreme of point Gellibrand bears N.E. by E. $\frac{1}{2}$ E. distant 2 miles.

Two bights, having $3\frac{1}{2}$ and $3\frac{1}{4}$ fathoms water, run half a mile into this bank from the south-eastward. The north-eastern bight, which is close to the low rocky point before noticed, approaches the mouth of Kororoit creek to one-third of a mile, with 3 fathoms water.

From the point of Altona a low shore with several small lagoons close behind it, forms a shoal bay, barely 1 mile deep, extending S.S.W. 4 miles to point Cook. At about midway between the two points is the mouth of Skeleton creek, which winds through the low swampy ground from the north-westward. The 3-fathoms edge of the shoal, which entirely fills this bay, extends beyond the line of the two points, and forms, midway, a spit projecting southward to N.E. $\frac{1}{2}$ N. $1\frac{3}{4}$ miles from point Cook.

POINT COOK is low and rocky, with a shoal spit extending 1 mile to the eastward, with 10 feet water at its extremity, at half-way between which and the shore there is a rocky patch with only 3 and 4 feet water on it. A *black* buoy is moored in $4\frac{3}{4}$ fathoms water, at a quarter of a mile off the spit, with point Cook bearing West, distant $1\frac{1}{4}$ miles.

From point Cook a low continuation of the north-western shore of Port Phillip trends S.W. $\frac{1}{4}$ W. 6 miles to Werribee river. At 2 miles to the south-westward of point Cook there is a low projection, from whence rocky shoals, with 3 and 4 feet water on them, project half a mile. The 3-fathoms

* From the Victoria Government Gazette.

edge of the shoal water, which borders the shore, extends from one-third of a mile off point Cook to about the same distance off the rocky shoals just mentioned. From thence to Werribee river the 3-fathoms edge of the shoal water generally extends a little more than a mile from the shore ; and from the mouth of the river, a spit with 16 feet water on its extremity, projects $1\frac{1}{2}$ miles to the south-eastward.

WERRIBEE RIVER has a 3-foot bar across its entrance, within which the first reach trends westward about 1 mile. It is about 1 cable wide, with 1 to 2 fathoms water. Above this reach the river is merely a small stream, flowing in a winding direction from about N.N.W.

WESTERN ARM of PORT PHILLIP.—Port Phillip from its entrance to Hobson bay having been described, the navigator's attention will be next directed to the Western arm of this extensive estuary, which forms the approach to Geelong, commencing with the southern shore at point George, noticed at page 217.

The southern shore of the Western arm of Port Phillip, after a slight curve for a little more than three-quarters of a mile in a N.W. by W. direction from point George, extends W. by N. $1\frac{1}{2}$ miles, and from thence nearly West $1\frac{3}{4}$ miles to point Richards. For the first 2 miles from point George, shoal spits and detached patches with 2 to 6 feet water on them, project upwards of one-third of a mile to a quarter of a mile from the shore. From 1 mile N.W. of point George to half a mile eastward of point Richards the 3-fathoms edge of a continuation of Prince George bank extends one-third of a mile to a quarter of a mile from the shore ; but from point Richards it projects N.W. by N. half a mile to a spit with 10 feet water on it, at a quarter of a mile to the northward of which is a *red* buoy, moored in $4\frac{1}{2}$ fathoms, with point Richards, bearing S.S.E., distant three-quarters of a mile.

From point Richards the shore trends S.W. $4\frac{3}{4}$ miles to Bellarine jetty, which projects about 100 yards from the land. For the first $1\frac{1}{2}$ miles south-westward of point Richards a bank, with 3 to 4 feet water on it, extends nearly two-thirds of a mile from the shore. From the outer edge of this bank, close to which there are 3 and 4 fathoms water, the 3-fathoms edge of the shoal water bordering the shore trends south-westward to two-thirds of a mile off the jetty. Three or four detached patches, with 3 to 6 feet water on them, lie between $1\frac{1}{2}$ and $2\frac{1}{4}$ miles south-westward of point Richards. There are only 6 feet water at about 1 cable's length off the jetty, and between half a mile and $1\frac{3}{4}$ miles to the north-eastward of it, spits with 3 to $4\frac{1}{2}$ feet water on them, project 3 and 4 cables' lengths from the shore.

The south shore from Bellarine jetty trends W. by S. $\frac{1}{2}$ S. $2\frac{1}{2}$ miles

to a slight projection of the land forming the south point of the south-east entrance of the Ship channel, through the Outer harbour of Geelong ; some rocks lie close to the shore on either side of the jetty, and between one and two-thirds of a mile to the westward of it. The 3-fathoms edge of the shoal water fronting the shore extends from half a mile off the jetty to 4 cables' lengths off the south entrance point of the Ship channel.*

The south-east entrance of the Ship channel into, and through the Outer harbour of Geelong lies between the slight projection of the land on the south side, and Wilson spit, the extremity of a bank extending from the north shore to 18 feet water, at $1\frac{1}{2}$ miles from the south shore. A *white* perch buoy is moored in 5 fathoms at South a quarter of a mile from the spit, and N. by W. a little more than 1 mile from the south entrance point. Two *black* buoys are moored on the southern side of the entrance, one in 4 fathoms, bearing S.E., distant half a mile, and the other in $3\frac{1}{2}$ fathoms, bearing S.W., distant nearly 1 mile from the *white* perch buoy.

The channel through this entrance is upwards of three-quarters of a mile wide, with $3\frac{1}{2}$ to 5 fathoms, the deepest water being between the *white* perch buoy and the *black* buoy to the south-eastward of it ; but a bank with 19 to 23 feet water over it, lies between a quarter of a mile and two-thirds of a mile to the south-westward of the *white* perch buoy.

The shore from the south entrance point of the Ship channel forms a bay extending N.W. by W. $\frac{3}{4}$ W. 4 miles to point Henry. It is barely 1 mile deep, and is mostly occupied by a bank, the 3-fathoms edge of which projects from 4 cables' lengths off the south entrance point to three-quarters of a mile eastward of point Henry, where a spit, with 16 feet water on it, extends a quarter of a mile northward from the edge of the bank.

The land between points Richards and Henry is mostly low, the hills scattered over it rarely exceeding 120 feet in height, except the summit of Bellarine, S. by W. $2\frac{3}{4}$ miles from point Richards, which attains an elevation of 447 feet. Much of this land is under cultivation, and has several villages and country residences of the merchants and other inhabitants of Geelong.

POINT HENRY is low, the Bluff, which is its most elevated part, being only 25 feet above the mean level of low water springs. A jetty projects about 150 yards from the east side of the point into 3 feet water.

ANCHORAGE.—There is good anchorage in 4 to 5 fathoms, mud, between 1 and $1\frac{1}{2}$ miles eastward of point Henry.

* See Plan of Geelong harbour, No. 2,731 ; scale, $m = 3$ inches.

THE NORTHERN SHORE of the western arm of Port Phillip from Werribee river trends S.W. $\frac{1}{2}$ S. $2\frac{3}{4}$ miles, and from thence W. by S. $2\frac{1}{4}$ miles to a low point, on the east side of which is a small stream flowing from the northward, and on the west side of the point is the mouth of Little river, which winds through the lowland from the W.N.W. From the projection of the land midway between Werribee and Little rivers a spit, with $4\frac{1}{2}$ feet water on its extremity, projects 1 mile to the southward.

BEACON POINT.—From Little river the shore extends S.S.W. $\frac{1}{2}$ W. $1\frac{1}{4}$ miles to Beacon point, from which a shoal spit projects two-thirds of a mile towards a beacon bearing S.E. by E. $\frac{1}{2}$ E., distant 1 mile from the point. There are two patches between the beacon and the spit; on the outer one there is 1 foot water, and the inner one is awash. From Werribee river to the point halfway between the river and Beacon point the 3-fathoms edge of shoal water projects irregularly half a mile to $1\frac{1}{2}$ miles; and from the halfway point to the beacon, $2\frac{1}{4}$ miles from the shore, the edge of the bank closing to within a quarter of a mile of the beacon.

KIRK POINT.—From Beacon point the shore extends S.S.W. $\frac{3}{4}$ W. $1\frac{1}{3}$ to Kirk point, and is also fronted by a bank, of which the 3-fathoms edge projects from half a mile southward of the beacon to about the same distance from Kirk point.

From Kirk point the low shore trends W.S.W. 2 miles, and from thence South $2\frac{3}{4}$ miles to point Wilson, forming a bay, of which the bight for a distance of $1\frac{1}{2}$ miles is filled by a mud-flat. For about a mile south-westward from Kirk point rocky spits project a cable's length to a quarter of a mile from the shore.

From half a mile off Kirk point the 3-fathoms edge of an extensive bank, with some shallow patches on it, curves in a S.S.W. and S.S.E. direction to a spit with 9 feet water on it, marked by a *black* and *red* buoy, moored in 3 or 4 feet water, from which point Wilson bears S.W. by W. $\frac{1}{2}$ W., distant $2\frac{1}{4}$ miles. From the extremity of this spit, the 3-fathoms edge of the bank, after turning two-thirds of a mile to the north-westward, extends S.S.W. $2\frac{3}{4}$ miles to another spit, having 15 feet water on it, and marked by a *red* perch buoy, moored on the bank in 14 feet water, at S.S.E. 1 mile from point Wilson: some small detached banks with 15 to 17 feet water on them lie within half a mile eastward and southward of the buoy.

WILSON SPIT.—From between one-third and two-thirds of a mile westward of the *red* perch buoy, a continuation of the bank which extends from point Wilson, trends S.S.E. and S. by W. $\frac{1}{2}$ W. 2 miles to Wilsons spit, which forms the north side of the south-east entrance of the Ship channel into, and through the Outer harbour of Geelong. This projecting bank, which has 13 to 17 feet water on it, is only 1 to 3 cables broad, the narrowest part being midway between the *red* perch buoy and the spit.

POINT WILSON is low, with a small islet close off it, and numerous rocks extending about a cable's length to the southward. Two detached patches, having 5 and 6 feet water on them, lie respectively E.S.E. one-third of a mile, and S.E. $\frac{1}{2}$ S. half a mile from point Wilson.

From point Wilson the shore extends in a N.W. by W. $\frac{3}{4}$ W. direction $1\frac{1}{2}$ miles to the central and longest of some jetties, projecting into 2 or 3 feet water; and from thence nearly half a mile westward to a low point, close off which lies Snake isle. The shore is bordered by mud and sand, with numerous rocks, which for upwards of three-quarters of a mile westward from point Wilson extend $5\frac{1}{2}$ cables' lengths to a quarter of a mile from the land.

SNAKE ISLAND extends from 100 yards to $4\frac{1}{2}$ cables' lengths from the main-land, with which it is connected by a shoal flat terminating to the southward in a rocky spit, projecting 2 cables' lengths southward from the island.

From the low point immediately behind Snake island the shore curves in a W.S.W. and southerly direction 1 mile to a double point, having a ledge of rocks projecting about 1 cable's length to the southward, between which and Snake island is a clear space of nearly one-third of a mile, with 9 to 13 feet water.

From two-thirds of a mile westward of the *red* perch buoy off point Wilson, the 3-fathoms edge of the bank fronting the shore trends N.W. by W. to a 17-feet spit, at S.W. a little more than 1 mile from point Wilson. From this spit the 3-fathoms edge of the bank extends irregularly, in a W. by N. $\frac{1}{2}$ N. direction 2 miles, to within half a cable's length of the ledge of rocks projecting from the double point already noticed. There are patches, with 3 and 4 feet water over them, between the edge of the bank and the rocks extending southward from Snake island.

POINT LILLIAS.—From between a quarter of a mile and half a mile westward of the double point just noticed, a tongue of land, not more than 2 to 3 cables broad, projects S.S.W. two-thirds of a mile from the line of coast to point Lillias, a double projection, bearing N. by E. $\frac{1}{4}$ E., distant $2\frac{3}{4}$ miles from the Bluff on point Henry.

BIRD ROCK.—From the western projection of point Lillias a narrow rocky ledge extends nearly S.S.W. one-third of a mile to Bird rock, on which stands a beacon. This rock, and the ledge connecting it with point Lillias, are enclosed by a rocky shoal, with 2 to 5 feet water on it, extending about 1 cable's length from the east side of the ledge, and S.W. 2 cables' lengths from the beacon to a *white* perch buoy, moored near the edge of the spit.

The 3-fathoms edge of the shoal bordering the shore, from 1 cable's length southward of the double rocky point, West of Snake island, trends

S.S.W. to 4 cables' lengths eastward of Bird rock, and then curves round in a S.E. by E. direction to the east point of a bank, which projects S.E. 1 mile from the rocky ledge between point Lillias and Bird rock. At half way out, this bank is only 2 cables broad ; but from its east point the south-eastern edge extends S.W. $\frac{1}{2}$ W. half a mile to the Outer Artificial cut, that forms a ship channel through the narrowest part of the bank. From this cut the bank, here only 1 cable broad, stretches S. by W. three-quarters of a mile to within a cable's length of the spit, which projects northward from the bank on the east side of point Henry. There are 15 to 17 feet water over this narrow ridge, and a *black* buoy on it, bearing N.E. $\frac{1}{2}$ N., distant a little more than 1 mile from the Bluff on point Henry.

THE OUTER HARBOUR of Geelong extends North and South $3\frac{1}{2}$ miles between the 3-fathoms edges of the banks fronting the north and south shores, and is bounded to the eastward by the bank, which projects from point Wilson to Wilson spit. On the west side it is separated from the Inner harbour by the bank and narrow ridge extending from point Lillias and a collection of other banks forming together, a bar, which stretches across from point Henry to point Lillias and to the shore to the westward of it.

The soundings over the Outer harbour are remarkably even, rarely varying from 4 to $4\frac{3}{4}$ fathoms, except on the western side, where there are 5 to $5\frac{1}{2}$ fathoms. The bottom is mostly mud, with some patches of clay.

THE SHIP CHANNEL and OUTER ARTIFICIAL CUT.—The Ship channel, from its south-east entrance, between the *white* and *black* buoys off Wilson spit, crosses the southern part of the Outer harbour in a N.W. by W. direction to the Outer Artificial cut through the bank, already noticed, extending from point Lillias. This passage, which bears N.E. by N. from the bluff on point Henry, and S.S.E. $\frac{3}{4}$ E. from Bird rock, has been dredged through the bank 1 cable's length in a S.E. and N.W. direction, and is half a cable wide, with 19 feet water.

This channel is marked by two *black* buoys on the south-west, and two *white* ones on the north-east side ; the eastern buoy, which is cone-shaped, as a distinguishing mark, is moored broad end down ; it swims nearly upright, and is surmounted by a staff and ball ; the other three are cask buoys. There is also a *white* buoy on the edge of the bank at a quarter of a mile north-eastward of the *white* cone buoy.

SOUTH CHANNEL.—At nearly N.W. half a mile from the Outer Artificial cut, is the eastern entrance of the South channel that has been cut through the bank which extends from point Henry to the north shore. It is $1\frac{1}{2}$ miles long E. $\frac{1}{2}$ N. and W. $\frac{1}{2}$ S., and 132 feet wide at the bottom, sloping to 165 feet at the surface, at its narrowest part. This channel, which has been dredged to the depth of 18 feet, has a *black* buoy on each side of its

eastern entrance, that on the south side being surmounted by a staff and ball. Within the entrance the channel is marked on the south side by *black*, and on the north side by *white* beacons.

At 4 cables' lengths within the eastern entrance, the channel communicates with a bight in the bank, extending a quarter of a mile to the southward, with 4 to 5 fathoms water; and opposite this are two other inlets having $3\frac{1}{2}$ fathoms, separated by a spit, on which is one of the *white* beacons that mark the north side of the channel.

The 3-fathoms edge of the bank from the east entrance of the South channel trends in a S.S.W. and S.S.E. direction to a small bight, with 20 feet water, within the spit before noticed to the eastward of point Henry. The western 3-fathoms edge of the bank from the western entrance of the South channel, extends nearly S. by W. $2\frac{1}{2}$ miles, and from thence W. by S. $\frac{1}{2}$ S. three-quarters of a mile to 1 cable's length off Limeburners point, which bears S.W. by W., distant 2 miles from the Bluff on point Henry.

The shoalest part of the bank between its 6-foot edges, extends from point Henry to the South channel, and is half a mile to a quarter of a mile broad, with a narrow ridge on it trending three-quarters of a mile from the South channel towards point Henry. There is a small knoll at $1\frac{1}{2}$ cables' lengths to the southward of the ridge, and on the north-eastern part of the bank is a 5-foot knoll, at a quarter of a mile to the south-westward of the *black* perch buoy.

THE BOAT CHANNEL, which has 5 to 7 feet water, crosses the bank at a quarter of a mile northward of point Henry; it trends about W.N.W. from E.S.E. between two *black* buoys, bearing respectively N. $\frac{1}{2}$ E., distant a little more than half a mile, and N.N.W. $\frac{1}{2}$ W. two-thirds of a mile from the Bluff on point Henry.

NORTH CHANNEL.—The eastern entrance of this channel lies between a quarter of a mile and 4 cables' lengths westward of Bird rock beacon, and has a light-vessel nearly in mid-channel, moored in 12 feet water, at $3\frac{1}{2}$ cables' lengths from the beacon. From the *white* perch buoy south-westward of Bird rock, the 12-foot edge of the bank which forms the eastern and northern limits of the channel, turns northward and then curves westward to a projection of the bank, close to the westward of which is a *red* buoy, W. by N. $\frac{1}{2}$ N. a quarter of a mile from the light-vessel.

THE BAR.—From the *red* buoy, the northern side of the channel, after trending about W.N.W. one-third of a mile, curves round $1\frac{1}{2}$ cables' lengths to the bar, which is 1 cable broad with 9 to 11 feet water on it.

The channel is bounded to the southward by the 12-foot edge of the bank, which, from the middle of the north side of the South channel, trends N. by E. $\frac{1}{2}$ E. to a spit within 100 yards of the light-vessel and

150 yards of the north side of the channel. Between this and another projection of the bank, on which is a *black* buoy, bearing West, distant half a mile from the light-vessel, is a bight in the bank, with 12 to 14 feet water, trending 3 cables' lengths to the south-westward.

From the western side of the Bar the North channel trends S.W. $\frac{1}{2}$ W. one-third of a mile to its western entrance, with a width of 150 to 200 yards between the 12-foot edges of the bank, and is marked by *black* buoys or beacons on the southern and *red* on the northern side.

GEELONG LIGHT-VESSEL, which lies in the eastern entrance of the North channel, is painted *red*, and shows a single *white* fixed light, 27 feet high, visible in clear weather, 7 miles off, and two *red* lights should she break adrift. A gong is sounded every 10 minutes in foggy weather, and signals are made on board to show the depth on the bar.

Tidal Signals.—A blue flag, 10 feet; a ball, $10\frac{1}{2}$; a ball under a blue flag, 11; a ball over a blue flag, $11\frac{1}{2}$; two balls 12 feet; two balls over a blue flag, $12\frac{1}{2}$; two balls under a blue flag, 13; two balls over a red flag, $13\frac{1}{2}$; two balls under a red flag, 14; a red flag between two balls, $14\frac{1}{2}$; a red flag, 15 feet.

The south-western 3-fathoms edge of the bank from the west entrance of the South channel trends N.W. one-third of a mile to the western entrance of the North channel, and from thence $1\frac{1}{4}$ miles in nearly the same direction towards the entrance of Limeburners creek. At about three-quarters of a mile to the north-westward of the entrance of the North channel, a narrow detached shoal, with 15 feet water on it, extends 4 cables' lengths along the edge of the bank, from which it is separated by a very narrow channel having 22 feet water.

The NORTH SHORE between point Lillias and a low point at N.W. $\frac{1}{2}$ W. half a mile from it, forms a bight, extending two-thirds of a mile to the north-eastward; but it is nearly filled by a flat of mud, sand, and weeds. At S.W. $1\frac{1}{2}$ cables' lengths from the low point is a beacon standing N.W. $\frac{1}{2}$ N., nearly two-thirds of a mile from Bird rock beacon.

From the low north-west entrance point of this bight the shore trends round westward and north-westward about $1\frac{3}{4}$ miles to the south-eastern entrance point of Limeburners creek; from this point a mud spit projects W.N.W. one-third of a mile to within 100 yards of the western side of the entrance, leaving a narrow channel with 20 feet water, between the spit and the western shore.

LIMEBURNERS CREEK from its entrance trends E.N.E. two-thirds of a mile, and from thence above the same distance in a N. by E. direction, and is 2 to nearly 4 cables wide. At about half a mile within the entrance a low point projects from the western shore, below which there is a basin having 7 to 13 feet water; but above the point the creek is mostly filled by a mud-flat, leaving only a narrow channel, carrying 6 to 11 and 5 feet

water for about a quarter of a mile along the eastern side of the creek, and then returning south-westward towards the point.

GEELONG INNER HARBOUR, the most spacious and secure anchorage in Port Phillip, extends from Limeburners point North nearly $4\frac{1}{4}$ miles to the entrance of Limeburners creek, and is $2\frac{1}{2}$ miles wide, between the western shore and the 6-foot edge of the bank which extends from point Henry to the north shore. The soundings are remarkably regular, over mud, the depth gradually increasing from the 3-fathoms edge of the bank on the eastern side, to 5 and $5\frac{1}{2}$ fathoms within a quarter of a mile of the western shore, and to 4 fathoms at 2 cables' lengths off the town of Geelong, in the south-west bight of the harbour.

The eastern shore from point Henry extends South 2 miles to an elbow of the coast-line, between which and a low point at half a mile to the westward of it, a shallow inlet nearly half a mile wide, trends three-quarters of a mile into the low flat land in an E.S.E. direction, towards point Henry township; but the inlet is filled by a mud-flat, which dries 1 and 2 feet above low water.

From the western entrance point of the inlet the low shore trends nearly W.N.W. $1\frac{1}{4}$ miles to Limeburners point. On the west side of the former point is a bight in the low land, about a quarter of a mile in extent, partly enclosing a remarkable pond in the mud-flat which projects from the bight.

The shore from three-quarters of a mile southward of point Henry to the same distance south-eastward of Limeburners point appears difficult to approach, in consequence of its being fronted by a continuous mud-flat, which extends 1 to 2 cables' lengths from the eastern shore and 4 cables' lengths northward from the west entrance point of the inlet. This mud-flat is again fronted by a broad shoal bank, the 6-foot edge of which curves round in a south-westerly direction from the western entrance of the Boat channel to Limeburners point.

GEELONG.—From Limeburners point the water frontage of the town of Geelong forms a bay two-thirds of a mile deep, extending from the point N.W. by W. $\frac{1}{4}$ W. $1\frac{3}{4}$ miles to Hutton wharf. There are generally 6 feet water within 150 yards, and 22 to 24 feet water within $1\frac{1}{2}$ cables' lengths of the shore.

YARRA WHARF, nearly 1 mile westward of Limeburners point, projects about 330 yards from the shore into 23 feet water. There is a smaller jetty on either side of the wharf extending about 120 yards from the shore into 6 or 7 feet water.

MOORABOOL WHARF.—CUSTOM HOUSE.—Moorabool wharf, 250 yards to the westward of Yarra wharf, extends 220 yards from the shore into apparently 12 or 13 feet water. There is a *red* buoy moored in 25

feet water, at nearly 1 cable's length to the north-eastward of the end of the wharf. The Custom-house is situated close within this wharf.

RAILWAY WHARF and RAILWAYS to BALLAARAT and MELBOURNE.—The Railway wharf, at 100 yards westward of Moorabool wharf, extends 350 yards from the shore into about 25 feet water. This wharf is the southern terminus of the Geelong and Ballaarat, and the Geelong and Melbourne railways, which form a junction at about $1\frac{1}{2}$ miles to the northward of Geelong station. From this junction the Geelong and Melbourne railway curves in a N.E. by N. and N.E. by E. direction nearly 32 miles over a low flat country to the Geelong junction, north-westward of Williamstown.

HUTTON WHARF projects about 200 yards from the shore into 15 feet water. Besides these wharves there are several small jetties and bathing-places between Limeburners point and Hutton wharf.

From Hutton wharf the western shore trends N. by E. a little more than 1 mile to the southern point of a cove about a quarter of a mile in extent, into the head of which Cowies creek flows through the low land from the north-westward. The shore from the northern point of this cove turns round 1 mile to the north-eastward, and then curves in nearly the same direction $1\frac{3}{4}$ miles to the entrance of Limeburners creek.

From Hutton wharf to the cove, and from thence to the projection of the shore at 1 mile to the north-eastward of it, there are $4\frac{1}{2}$ to $5\frac{1}{2}$ fathoms water within $1\frac{1}{2}$ cables' lengths of the shore; but from this projection to the entrance of Limeburners creek the shore is fronted by a bank, of which the 3-fathoms edge, at two thirds of a mile southward of the entrance, forms a spit extending about half a mile from the shore. Between this spit and the bank fronting the opposite shore a narrow inlet, having 22 to 19 feet water, trends northward about half a mile towards the entrance of Limeburners creek.

ASPECT.—STATION PEAK.—The country between Melbourne and Geelong is generally low, flat, and partially wooded; it is intersected by several creeks, already noticed, and there are many small lagoons, most of which are situated near the shore within about 8 miles of Williamstown.

The only hills in the neighbourhood worthy of notice appear to be the Youangs, the most elevated of which is Station peak, rising from the southern portion of the group to the height of 1,132 feet. It bears nearly N. $\frac{3}{4}$ W., distant $10\frac{3}{4}$ miles from the bluff on point Henry, and is in lat. $37^{\circ} 57' 12''$ S., long. $144^{\circ} 25' 40''$ E.

DIRECTIONS.—For PORT PHILLIP from the WESTWARD.—Vessels from the westward bound to Port Phillip, usually make the land about the high bold promontory of cape Otway, which is easily distin-

guished by the *white* circular light-house on it, with the revolving light, and the telegraph station, to which passing vessels, whether bound to Port Phillip or not, are recommended to show their numbers, and communicate what public intelligence they may have.

It is desirable to round cape Otway at a distance of not less than 3 or 4 miles, and when the light-house bears W. by N. $\frac{1}{2}$ N., distant 6 miles, the course and distance to Port Phillip heads will be N.E. 56 miles, passing $3\frac{1}{2}$ miles outside Henty reef; to avoid which, see page 209. As no other dangers project beyond a mile from the shore, they will be cleared by giving the coast a berth of not less than 2 miles. Should the cape be rounded early in the evening, with a fresh southerly breeze, beware of overrunning the distance, as a strong current, after a prevalence of southerly gales, often sets along the land to the N.E.; and when abreast of Split point, if a stranger finds there will not be sufficient daylight to get into pilot waters, he should stand off and on shore under easy sail till daylight, not shoaling the water to less than 20 fathoms.

After passing Split point, 36 miles to the north-eastward of cape Otway, if the weather be at all clear, Arthur's Seat will be seen rising inland over the waters of Port Phillip before the lower, and nearer land in that direction, becomes visible. Proceeding onward, the land about cape Schanck will be seen to the eastward, appearing at first like a long low island trending to the S.E. On nearing the entrance, Barwon head will open out on the port bow. This headland, formerly known as Flinders point, is a good mark for making the port; but in thick hazy weather, care must be taken not to mistake this for Port Phillip heads, which in several instances, has led to vessels going ashore.

Vessels from the southward and westward, sighting Shortland Bluff high light to the eastward of N.E. by E., should, to avoid Barwon bight, haul out eastward, to open Shortland bluff low light, which will be first seen on a N.E. by E. bearing; and in proceeding to bring the two lights in line, the low light will change from *white* to *red* on a N.E. bearing.

For PORT PHILLIP from the EASTWARD.—Vessels steering for Port Phillip from the southward and eastward, usually make the land about cape Schanck, 17 miles to the south-eastward of the entrance. The cape has a round *white* light-house on its highest part, which exhibits a fixed and flashing light, visible in clear weather, at the distance of 23 miles. Vessels having passed cape Schanck should keep a good offing, in proceeding towards the heads, until they open out Shortland Bluff light-houses, which the intervening land of Nepean point prevents being seen before the high fixed light bears N. $\frac{1}{2}$ W., and the low light N. $\frac{1}{2}$ E.; and in proceeding to bring the two lights in line, the low light will change its colour from *white* to *red* on a N.N.E. bearing.

To ensure passing outside the Lightning rock, the light-house on point Lonsdale should not be brought to the westward of N.W. until the two light-houses on Shortland bluff are in line. And a stranger making the entrance at night, within the range of the *green* light of point Lonsdale, must bear in mind that the line of its outer limit passes within three-quarters of a mile of the Lightning rock, and the blending of the *green* with the *red* light is in a direct line over the rock.

CAUTION not to HEAVE TO.—At night, a vessel should keep a good offing, and on no account be hove to when waiting for daylight near Port Phillip heads. Several vessels that have done so, have drifted into danger ; two, the *Sacramento* and the *Earl of Charlemont*, were lost, one on point Lonsdale, and the other on Charlemont reef, from this cause, combined with inattention to the lead and the state of the tide.

CAUSES of WRECK at the HEADS.—A careful inquiry into the casualties which have occurred at the entrance of Port Phillip, has shown that in nearly every case, they have taken place in consequence of the vessel's either attempting to enter the heads at night without a pilot, or against a strong ebb stream ; which it must be remembered, runs partly athwart the entrance with great force, frequently at the rate of 7 knots, causing a high confused tumbling sea, which in southerly or westerly gales, often breaks from point to point. The mariner must not suppose that because he has a fine fair wind outside the heads, he can always force his vessel against the ebb. To this error is attributable the loss of several vessels. The wind, although fresh outside, frequently falls light just as the vessel gets into the Tide-ripple between the heads, when she becomes unmanageable ; and even with a strong breeze, vessels often shear athwart the tide, which hereabouts forms a series of strong irregular eddies.

WAITING for TIDE.—By attention to the tidal signals on point Lonsdale, the time and state of the tide will be known ; and it is advisable for vessels waiting for the turn of tide outside the heads, to keep the point Lonsdale shore aboard, where the stream runs fairer, and in bad weather, small vessels incur less danger from tide-ripples, and will have much smoother water.

PILOTS.—As there is constantly one pilot-vessel outside the heads, when there is a possibility to keep the sea, no stranger should attempt entering without taking a pilot ; but the channels are so carefully lighted and buoyed, that it is quite possible to do so. A vessel intending to proceed from sea to Geelong, and requiring the harbour pilot, would save time by sending a telegram from the heads, stating draught of water, to the harbour master, who would have a pilot ready to board the vessel off point Henry.

BUOYS.—The following arrangement and classification of buoys, marking shoals, channels, wrecks, &c., have been adopted by the Government of Victoria for the harbours of that colony, and are observed at the entrances of Corner inlet and Port Albert.

Entering from sea, *white* or *red* buoys, with even numbers, to be left on the starboard hand ; *black* buoys, with odd numbers, on the port hand. *Chequered* buoys to be passed on either side ; and *green* buoys marked “ Wreck ” are moored close to sunken vessels.

TO ENTER the HEADS with the FLOOD.—Should a pilot not have been taken on board outside the heads, and the last quarter ebb signal be up, or the flood stream be made, steer, when within 8 or 10 miles of the entrance, to bring the high light-house on Shortland bluff to bear N.E.byN., which will be in line with the low light-house ; and with a fresh fair wind and flood-stream, steer so as to keep the two light-houses in line, until the *red* beacon on the rocky islet off point Nepean is open to the southward of that point.

Lonsdale rock is cleared on its east side by keeping Swan Island beacon open of Shortland bluff, until Point Lonsdale telegraph house, *white* with a slate roof, opens well to the northward of the tidal flag-staff. Vessels drawing less than 14 feet may, in the day time, pass between Lonsdale rock and reef by keeping Swan point a little open of Shortland bluff.

Lightning rocks are cleared on their west side, by keeping the *red* obelisk on Shortland bluff touching the east side of the high light-house, N.N.E. $\frac{1}{4}$ E., until Point Lonsdale telegraph house opens well out to the northward of the tidal flag-staff.

A vessel entering between the Lightning and Corsair rocks will clear the west side of the Corsair rock by keeping the low light-house on Shortland bluff in line with the east end of the light-keeper's house near the high light-house, N.N.E. $\frac{1}{4}$ E., until the *white* beacon on point Nepean is well open northward of the *red* beacon on the rocky islet off that point.

With a scant or light easterly wind and flood stream, Swan Island beacon must be kept open of Shortland bluff, so as to avoid Lonsdale rock.

To enter the Heads against the Ebb steer, when within 2 miles of the heads, to get the low light-house open to the East of the high one, until the vessel draws near point Lonsdale, when haul as close round Lonsdale reef as practicable ; taking care, however, if her draught be more than 14 feet, to avoid Lonsdale rock by not shutting Swan Island beacon in with Shortland bluff, and on no account to shut in Swan point with Shortland bluff until clear of Lonsdale reef, and the *red* beacon on the rocky islet off point Nepean is open to the southward of that point, when the rocks and reefs in the entrance will be cleared.

To work in between the Heads.—Is best done near the time of slack water, when the race will be nearly quiet, and the vessel will be much more under command. In standing to the westward, Swan Island beacon must be kept open of Shortland bluff until Point Lonsdale telegraph house opens well to the northward of the tidal flag-staff. Vessels of light draught may stand more in-shore, keeping Swan point a little open of Shortland bluff, making due allowance for the set of the flood stream. After clearing Lonsdale rock and reef keep Swan Spit light-house open of Shortland bluff, in order to avoid Victory shoal and the foul ground between point Lonsdale and Shortland bluff.

In standing to the eastward, a vessel should not proceed farther than when the obelisk on Shortland bluff touches the east side of the high light-house, bearing N.N.E. $\frac{3}{4}$ E., to avoid the Lightning rock and the tide-ripples near point Nepean.

At Night.—The passage through the heads should not be attempted at night, except with steam or a commanding fair wind; but to enter under either of these favourable circumstances, when the high and low lights on Shortland bluff are clearly distinguished, the low light showing *red*, they must be brought in line, bearing N.E. by N., which will lead through the fairway, nearly midway between the Lonsdale and Lightning rocks.

Should the wind become scant, and a vessel be compelled to tack when near Lonsdale reef or the Corsair rock, these dangers will be avoided by vessels of light draught, so long as Shortland bluff low *red* light is kept in sight; but they must be careful to go about or haul towards mid-channel before the low light changes from *red* to *white*.

In entering, Point Lonsdale light will first appear *green*, bearing N. by W., and so long as this colour is in full view the vessel will be to seaward of the Lonsdale and Lightning rocks; when the *green* begins to blend with *red*, bearing N.W. $\frac{1}{2}$ W., she will be in the fairway, in line between the two rocks; when the *red* light opens into full view she will be past these dangers; and when the *red* light is seen, on a W. by N. bearing, the vessel will be inside the Corsair rock.

ANCHORAGE.—Having entered and cleared the dangers which lie between the heads, a vessel may proceed north-eastward for the anchorage off Shortland bluff, towards the West channel; or a vessel of great draught, eastward, for the anchorage off the Sanitary station, in the entrance of the South channel. Strangers entering the port from stress of weather, should not attempt to proceed above these anchorages without a pilot.

Off Shortland bluff.—If necessary to anchor off Shortland bluff before proceeding through the West channel, steer north-eastward from the entrance, keeping Swan Spit light open of Shortland bluff, to avoid the Victory shoal; and if of heavy draught, she should anchor on the south-east

side of the fairway, which is shown in the daytime by Swan Spit light-house being just open West of No. 2 *white* perch buoy: at night, by Swan Spit light changing from *red* to *white*, N.E. $\frac{3}{4}$ N.

With the view of keeping the fairway to the West channel clear, vessels of light draught, when anchoring off Shortland bluff, should bring up as close towards the shore as possible on the north-west side of the fairway, with Swan Spit light-house just open East of No. 1 *black* buoy; and at night, with Swan Spit light changing from *red* to *white*, on a N.E. $\frac{1}{2}$ E. bearing.

When about to anchor off Shortland bluff at night, it must be remembered that the low light shuts in on a W. by N. bearing.

Off the Sanitary Station.—If from quarantine regulations, southerly gales, or from drawing too much water to take the West channel, it be necessary to anchor off the Sanitary station before proceeding through the South channel, a vessel should, after getting well inside the heads, steer eastward along the north side of point Nepean, avoiding the shoals which front the shore by keeping Barwon head well open of point Lonsdale; or, at night, by keeping just to the southward of the W. by S. limit of the *red* light from point Lonsdale; and having brought the high light on Shortland bluff to bear about N.W., anchor in 8 or 9 fathoms, abreast of the Sanitary station, at half a mile or three-quarters of a mile from the shore.

Not to Anchor in the Channels.—It is not advisable in bad weather, to anchor in either the West or South channel, on account of the stream and the loose nature of the bottom; but in south-west gales small vessels will find good shelter in $3\frac{1}{2}$ fathoms, under Swan spit, with the high light-house just shut in with Swan point, at about half a mile off shore. And vessels bound up, and caught in the South channel with a northerly or north-west gale, will find anchorage in Capel sound, in 5 to 7 fathoms, sand, by bringing the White cliff to bear S.W., and the top of Arthur's seat East. But, if daylight permit, it would be better to get back to the anchorage off Shortland bluff.

No stranger should anchor close to the heads, except it be to save the vessel from going ashore; although coasters sometimes, to avoid being carried by the stream inside the heads in a calm, anchor at about a mile outside, where the bottom is sandy; and sometimes in the bight between Barwon head and point Lonsdale.

WEST CHANNEL.—If bound directly through the West channel, after entering the heads and clearing the dangers in the entrance, steer N.E. from the fairway between points Lonsdale and Nepean, to pass on the west side of No. 2 *white* perch buoy, keeping Swan point well open of Shortland bluff, to avoid Victory shoal, and giving the bluff a berth of at least 2 cables' lengths, to avoid the reef which projects from it. Having

passed Shortland bluff, keep Point Lonsdale light-house open of it, S.W. by W. $\frac{1}{4}$ W., which will clear the bank with the 7-foot rock on it, between Shortland bluff and Swan spit.

Leaving No. 2 *white* perch buoy at about a cable's length to the southward, haul a little more to the northward, to pass about a cable's length to the south-eastward of No. 1 *black* buoy and Swan Spit light-house, and from thence steer N.N.E. up the channel, keeping the West channel light-vessel a little on the starboard bow, and giving a berth to the spit, which projects north-eastward from No. 3 *black* buoy. When clear of this, continue the N.N.E. course until past No. 12 *white* perch buoy; then bring the light-vessel on the port bow, and pass about a quarter of a mile to the south-eastward of her. Vessels with a scant wind, proceeding up against the ebb stream, must not stand too near the eastern bank, as they are liable to be set upon it, especially at the northern end of the channel.

Vessels of less than 15 feet draught, may enter the West channel between the Pope's Eye and the Royal George sands by passing a cable's length westward of the Pope's Eye *red* buoy, and then steering N.E. $\frac{1}{4}$ N., until the *white* cask buoy at the east end of the Royal George sand comes in line with Swan Island beacon, N.W. by N; when, after leaving the *white* cask buoy about a cable's length to the westward, steer so as to pass about the same distance to the south-eastward of Swan Spit light-house.

At Night.—Vessels steering for the West channel, will avoid the reef which projects from Shortland bluff and the bank between it and Swan spit, and will clear the western end of Royal George shoal, by not opening out Swan Spit *white* light, N.E. $\frac{1}{4}$ E., and keeping the Swan spit *red* light in view until within 1 cable's length of the light-house, when they will be above No. 2 *white* perch buoy, and should haul to the eastward and open Swan Spit *white* light, N.E. $\frac{3}{4}$ N., giving the light-house a berth of a cable's length in passing.

WEST CHANNEL to HOBSON BAY.—From West Channel light-vessel the course is nearly N. by E. $\frac{1}{4}$ E., and the distance $20\frac{1}{2}$ miles to Point Gellibrand light-vessel. There are no dangers in the way, and the soundings are regular, gradually increasing from 9 fathoms at a mile north-eastward of West Channel light-vessel to 12 fathoms midway, and from thence decreasing to 6 fathoms at 1 mile to the southward of Point Gellibrand light-vessel; and the bottom being soft mud and shells, a vessel may anchor anywhere along this route.

Working Up.—Vessels working up from the West Channel light-vessel to Hobson bay, must not stand into less than 5 fathoms on either side, nor approach the western shore nearer than 3 miles, until Station peak comes on with point Cook, W. by S. $\frac{1}{4}$ S.; when, in standing to the westward, Hobson Bay light-vessel must not be brought to the eastward of E.N.E.,

nor must point Gellibrand be approached within half a mile, until to the northward of it. And it should be remembered that the bottom, at the distance of a mile off shore, from point Gellibrand to point Wilson, is rocky, with shoal patches.

ANCHORAGE.—Having passed eastward of Point Gellibrand light-vessel, which may be rounded within a cable's length, in 5 fathoms, the best anchorage will be found in 4 fathoms, with the site of the old light-house on point Gellibrand bearing from South to S.W. Moor with the heaviest anchor to the westward in winter, and to the eastward in summer.

SOUTH CHANNEL.—If bound through the South channel, after having entered and cleared the dangers between the heads, steer along the north side of the land of point Nepean, in 8 or 9 fathoms, with Barwon head just open of point Lonsdale, nearly W. $\frac{1}{2}$ S., passing three-quarters of a mile to the southward of the Pope's Eye *red* buoy, and midway between the *chequered* buoy on Nicholson's knoll, and No. 1 *black* perch buoy, three-quarters of a mile to the northward of it. From thence steer nearly E. $\frac{1}{2}$ S., midway between the *white* buoys, which mark the south side, and the *black* buoys, which mark the north side of the channel.

Having passed out of the South channel between Capel Sound *white* perch buoy and No. 11 *black* buoy, 2 cables' lengths to the north-eastward of it, continue E. $\frac{1}{2}$ S., to pass about 1 cable's length southward of No. 13 *black* buoy, and then steer E. by N. and round, on the south-east side, No. 15 *black* perch buoy, which marks the eastern spit of the Middle ground. The banks on either side are steep-to, with the flood setting strongly over the northern banks, and the ebb over the southern banks.

Working through.—Vessels working through the South channel must be guided by the lead, not standing into less than 4 fathoms on either side, nor within the line of buoys; bearing in mind the tide streams which set over the banks. After passing Capel Sound *white* perch buoy there is plenty of room between the Middle ground and the shore, which is approachable within three-quarters of a mile, in 5 fathoms. When clear of the Middle ground, and to the northward of Martha point, a vessel may stand westward until point George comes on with Station peak, bearing nearly N.W. by W. $\frac{1}{2}$ W.

At Night.—If bound through the South channel at night, after getting well inside the heads, steer eastward, taking care to keep close to the southward of the W. by S. limit of Point Lonsdale *red* light, to clear the shoals which border the northern shore of point Nepean; the least depth of water being 16 feet, on the small patch which bears S. $\frac{1}{4}$ E. from Shortland Bluff high light-house. As the low light-house on Shortland bluff shows a *white* light up the South channel to the east end of Capel sound, vessels below Capel Sound *white* perch buoy will avoid the northern bank by not

shutting in the *white* light W. by N.; the least depth of water being 16 feet, on a slight projection of the bank close to the westward of No. 5 *black* buoy, and bearing S. by E. $\frac{1}{2}$ E. from West Channel light-vessel.

SOUTH CHANNEL to HOBSON BAY.—Having cleared the South channel and rounded No. 15 *black* perch buoy, which marks the eastern spit of Middle ground, steer N. $\frac{1}{2}$ W. 27 miles, which will be the course and distance from thence to Hobson bay; enter eastward of Point Gellibrand light-vessel and anchor or moor, as directed at page 250.

Working up.—As the eastern shore of Port Phillip is free from outlying dangers, it may be approached within a mile, from Arthur's Seat all the way up to Red cliff. Between the Anonyma shoal and Hobson bay shoal water extends farther from the shore, which should therefore be approached according to the vessel's draught.

WEST CHANNEL to GEELONG.—A vessel bound from the West channel to Geelong, should, after rounding No. 9 *black* buoy, North of the light-vessel, steer N. by W. 6 miles for the *black* buoy off the north-east extreme of Prince George bank. Round the buoy, at the distance of half a mile to the northward of it, and then steer W. $\frac{1}{2}$ S. for the *red* buoy off point Richards, and having rounded it at the distance of a cable's length, haul up S.W. by W. for the *white* perch buoy off Wilson spit, which may be passed on either side, unless the vessel's draught exceeds 14 feet; in which case pass as close as possible to the southward of the buoy.

ANCHORAGE.—If it is intended to anchor in the Outer harbour of Geelong, before entering the Inner harbour, steer W.N.W. from the *white* perch buoy, and come to in $4\frac{1}{2}$ fathoms, with Point Henry bluff bearing W.S.W., at about 1 mile from the shore.

Working up.—A vessel bound from the West channel to Geelong, having a contrary wind between the West Channel light-vessel and the *black* buoy off the north-east extreme of Prince George bank, should not stand into less than 5 fathoms, nor bring the light-vessel to the eastward of S. by E., until North of the Prince George buoy, between which and the *red* buoy off point Richards a vessel should not stand into less than 5 fathoms, nor bring that point to the westward of W. by S. From point Richards to point Henry the south shore should not be approached in less than 4 fathoms, nor within 1 mile; and the north shore in less than 5 fathoms, nor within 3 miles, until to the westward of Wilson spit, which is marked by the *white* perch buoy off it.

From the OUTER to the INNER HARBOUR.—SOUTH CHANNEL.—From the *white* perch buoy off Wilson spit steer N.W. by W. for the

nor must point Gellibrand be approached within half a mile, until to the northward of it. And it should be remembered that the bottom, at the distance of a mile off shore, from point Gellibrand to point Wilson, is rocky, with shoal patches.

ANCHORAGE.—Having passed eastward of Point Gellibrand light-vessel, which may be rounded within a cable's length, in 5 fathoms, the best anchorage will be found in 4 fathoms, with the site of the old light-house on point Gellibrand bearing from South to S.W. Moor with the heaviest anchor to the westward in winter, and to the eastward in summer.

SOUTH CHANNEL.—If bound through the South channel, after having entered and cleared the dangers between the heads, steer along the north side of the land of point Nepean, in 8 or 9 fathoms, with Barwon head just open of point Lonsdale, nearly W. $\frac{1}{2}$ S., passing three-quarters of a mile to the southward of the Pope's Eye *red* buoy, and midway between the *chequered* buoy on Nicholson's knoll, and No. 1 *black* perch buoy, three-quarters of a mile to the northward of it. From thence steer nearly E. $\frac{1}{2}$ S., midway between the *white* buoys, which mark the south side, and the *black* buoys, which mark the north side of the channel.

Having passed out of the South channel between Capel Sound *white* perch buoy and No. 11 *black* buoy, 2 cables' lengths to the north-eastward of it, continue E. $\frac{1}{2}$ S., to pass about 1 cable's length southward of No. 13 *black* buoy, and then steer E. by N. and round, on the south-east side, No. 15 *black* perch buoy, which marks the eastern spit of the Middle ground. The banks on either side are steep-to, with the flood setting strongly over the northern banks, and the ebb over the southern banks.

Working through.—Vessels working through the South channel must be guided by the lead, not standing into less than 4 fathoms on either side, nor within the line of buoys; bearing in mind the tide streams which set over the banks. After passing Capel Sound *white* perch buoy there is plenty of room between the Middle ground and the shore, which is approachable within three-quarters of a mile, in 5 fathoms. When clear of the Middle ground, and to the northward of Martha point, a vessel may stand westward until point George comes on with Station peak, bearing nearly N.W. by W. $\frac{1}{2}$ W.

At Night.—If bound through the South channel at night, after getting well inside the heads, steer eastward, taking care to keep close to the southward of the W. by S. limit of Point Lonsdale *red* light, to clear the shoals which border the northern shore of point Nepean; the least depth of water being 16 feet, on the small patch which bears S. $\frac{1}{4}$ E. from Shortland Bluff high light-house. As the low light-house on Shortland bluff shows a *white* light up the South channel to the east end of Capel sound, vessels below Capel Sound *white* perch buoy will avoid the northern bank by not

shutting in the *white* light W. by N.; the least depth of water being 16 feet, on a slight projection of the bank close to the westward of No. 5 *black* buoy, and bearing S. by E. $\frac{1}{2}$ E. from West Channel light-vessel.

SOUTH CHANNEL to HOBSON BAY.—Having cleared the South channel and rounded No. 15 *black* perch buoy, which marks the eastern spit of Middle ground, steer N. $\frac{1}{2}$ W. 27 miles, which will be the course and distance from thence to Hobson bay; enter eastward of Point Gellibrand light-vessel and anchor or moor, as directed at page 250.

Working up.—As the eastern shore of Port Phillip is free from outlying dangers, it may be approached within a mile, from Arthur's Seat all the way up to Red cliff. Between the Anonyma shoal and Hobson bay shoal water extends farther from the shore, which should therefore be approached according to the vessel's draught.

WEST CHANNEL to GEELONG.—A vessel bound from the West channel to Geelong, should, after rounding No. 9 *black* buoy, North of the light-vessel, steer N. by W. 6 miles for the *black* buoy off the north-east extreme of Prince George bank. Round the buoy, at the distance of half a mile to the northward of it, and then steer W. $\frac{1}{2}$ S. for the *red* buoy off point Richards, and having rounded it at the distance of a cable's length, haul up S.W. by W. for the *white* perch buoy off Wilson spit, which may be passed on either side, unless the vessel's draught exceeds 14 feet; in which case pass as close as possible to the southward of the buoy.

ANCHORAGE.—If it is intended to anchor in the Outer harbour of Geelong, before entering the Inner harbour, steer W.N.W. from the *white* perch buoy, and come to in $4\frac{1}{2}$ fathoms, with Point Henry bluff bearing W.S.W., at about 1 mile from the shore.

Working up.—A vessel bound from the West channel to Geelong, having a contrary wind between the West Channel light-vessel and the *black* buoy off the north-east extreme of Prince George bank, should not stand into less than 5 fathoms, nor bring the light-vessel to the eastward of S. by E., until North of the Prince George buoy, between which and the *red* buoy off point Richards a vessel should not stand into less than 5 fathoms, nor bring that point to the westward of W. by S. From point Richards to point Henry the south shore should not be approached in less than 4 fathoms, nor within 1 mile; and the north shore in less than 5 fathoms, nor within 3 miles, until to the westward of Wilson spit, which is marked by the *white* perch buoy off it.

From the OUTER to the INNER HARBOUR.—SOUTH CHANNEL.—From the *white* perch buoy off Wilson spit steer N.W. by W. for the

upright *white* cone buoy at the entrance of the Outer Artificial cut. In passing through the cut leave the *white* buoys on the starboard, and the *black* on the port, hand, and then steer direct for the Bird Rock beacon ; taking care to keep it a little open to the westward of a gap in the trees N.W. of the rock, until the *black* beacons, which mark the south side of the South channel, begin to be brought in line, when haul sharp up and proceed through the channel, keeping midway between the two lines of beacons.

As both the flood and ebb streams set across the entrance of the South channel, care must be taken that the vessel is kept under good command, to prevent her being set on either bank. Vessels drawing 20 feet can, by choosing a proper time of tide, and employing steam, pass through the channel, from the Outer to the Inner harbour, and go close up to the Geelong wharves.

The height of water in the South channel can always be ascertained by adding 8 feet to the height in the North channel, as shown by the tidal signals hoisted on board the light-vessel ; for which see page 241.

When using the South channel its limited width must be especially remembered, so that every precaution may be taken to avoid collision with other vessels, or with the buoys or beacons. Although there is width enough in this channel for ordinary vessels to pass each other from opposite directions, it is advisable not to do so, to prevent accidents ; but a vessel should wait outside either entrance when another vessel is seen entering from an opposite direction, until she has passed through.

ANCHORAGE.—Having cleared the South channel steer S.W. $\frac{1}{2}$ S. 3 miles, and anchor in $4\frac{1}{2}$ fathoms, at 3 cables' lengths to the northward of the Geelong wharves ; the bottom being soft mud mixed with sand and clay, a long scope of chain is necessary, in strong winds, to prevent the vessel from driving.

NORTH CHANNEL.—A vessel of less than 9 feet draught, bound from the Outer to the Inner harbour of Geelong may, as before directed, proceed for the *white* upright cone buoy at the entrance of the Outer Artificial cut, and having passed through this channel, leaving the *black* buoys on the port, and the *white* buoys on the starboard, hand, steer for the light-vessel, keeping her on the starboard bow until close to. Pass the light-vessel on the south-west side ; then haul up for the *red* buoy, and bring it half a point on the starboard bow, leaving it and all the *red* dolphins on the starboard hand, and the *black* buoys and dolphins on the port hand. Having cleared the North channel steer S.W. by S. $3\frac{1}{4}$ miles, and anchor off Geelong wharves, as directed when coming from the South channel.

From GEELONG to HOBSON BAY.—Vessels of more than 14 feet draught, bound from Geelong to Hobson bay, should, after passing through the South channel and the Outer Artificial cut, proceed S.E. by E. for the *white* perch buoy off Wilson spit, from whence the course is N.E. $\frac{1}{4}$ N., and the distance $25\frac{1}{2}$ miles, to Point Gellibrand light-vessel. But a vessel of great draught, by first steering N.E. $\frac{1}{4}$ E. until Station peak bears W.N.W., and then altering course to N.E. $\frac{1}{2}$ N. for point Gellibrand, will avoid the shoal water off Werribee river, and be outside the 5-fathoms edge of the bank between it and point Gellibrand, passing two-thirds of a mile off the *black* buoy which marks the shoal projecting from point Cook.

From HOBSON BAY out to SEA by the WEST CHANNEL.—Vessels bound to sea from Hobson bay by the West channel, will generally clear the heads the same day, by leaving Hobson bay two or three hours before daylight, when there is frequently a moderate land or northerly wind. A S. by W. $\frac{1}{4}$ W. course, 20 miles, from a fair berth off the light-vessel, leads down to the West Channel light-vessel, where; if prevented by southerly gales from proceeding through the channel, a vessel will find good anchorage by bringing the light-vessel to bear S. by W., and just shutting in Station peak with Indented head.

From the northern entrance proceed through the West channel, following inversely, the directions already given for going northward, keeping the *white* buoys on the port, and the *black* buoys on the starboard, hand. Having passed Swan Spit light-house haul more to the south-westward, passing between No. 1 *black* buoy on the starboard, and the Royal George *white* perch buoy on the port, hand, and keeping point Lonsdale a little open of Shortland bluff. After leaving the Royal George buoy steer for the extremity of Shortland bluff, giving it in passing, a berth of about a quarter of a mile; and in proceeding out between the heads, keep the two Shortland Bluff light-houses in line astern, bearing N.E. by N., due attention being paid to the tide streams.

SOUTH CHANNEL.—Vessels bound out to sea from Hobson bay by the South channel, should steer from Point Gellibrand light-vessel S. $\frac{1}{2}$ E. 27 miles, for No. 15 *black* perch buoy, which marks the east spit of the Middle ground, after rounding which, haul up S.W. by W. for the White cliff, until Capel Sound *white* perch buoy comes open to the northward of Observatory point flag-staff; then steer for this buoy, pass close to the northward of it, and bring it in line with Arthur's Seat; these kept in line astern, bearing E. $\frac{3}{4}$ S., will lead down in mid-channel, leaving the *white* buoys on the port, and the *black* buoys on the starboard hand.

Having cleared the South channel, steer W. $\frac{1}{2}$ S., to pass midway between the *chequered* buoy on Nicholsons knoll, and No. 1 *black* buoy to the northward of it. Continue this course until Shortland bluff light-houses are in line N.E. by N., with which marks on astern, proceed out between the heads to sea, paying due attention to the tide streams.

Working.—Vessels leaving Hobson bay against strong southerly winds, especially during the summer months, when these winds prevail, will sooner get to sea by working down the east side of Port Phillip, and going through the South channel, where, having smooth water, they will be enabled to lead through the South channel, down to the entrance between the heads. Whereas, by beating down the middle of Port Phillip, and taking the West channel, more swell would be experienced, and a large vessel would probably have to anchor off the West Channel light-vessel, and wait for a shift of wind.

From GEELONG out to SEA by the WEST CHANNEL.—From the Outer Artificial cut steer S.E. by E. for the *white* perch buoy off Wilson spit, and from thence N.E. by E. for the *red* buoy off point Richards. Having passed close outside this buoy, haul in E. $\frac{1}{2}$ N., to go half a mile northward of the *black* buoy off Prince George bank, and when it comes in line with Indented head, steer S. by E. $\frac{1}{4}$ E. for the West Channel light-vessel, from whence proceed through the channel and out to sea, as directed when going from Hobson bay.

By the SOUTH CHANNEL.—A vessel bound to sea from Geelong by the South channel, should proceed as just directed, from the Outer Artificial cut to half a mile northward of the *black* buoy off Prince George bank; and from thence proceed S.E. $\frac{1}{2}$ S. 15 miles for the *black* perch buoy, which marks the eastern spit of the Middle ground, and having rounded this, follow the directions given for proceeding out to sea from Hobson bay by the South channel.

ANCHORAGE.—Vessels having good ground-tackle may, if necessary, anchor in any part of Port Phillip above the entrance banks, there being nowhere a greater depth than 15 fathoms, and good holding-ground; but the northern part is preferable, as the wind usually veers from North, round westerly, to S.W., making the northern the weather shore.

Outside the Heads.—Steamers and coasting vessels from Port Phillip bound round cape Otway, encountering heavy weather, might, instead of running back to the heads, find shelter in Loutit bay, in 5 to 7 fathoms, within half a mile of the shore, sheltered from all winds from South, round westerly, to N.E.; or in Apollo bay, in 7 fathoms, at about a mile

off shore, with Point Bunbury flag-staff S.W. by S., and cape Patton N.E. by E. Vessels availing themselves of either of these bays, have only to round the reefs off the points, at a moderate distance, and may then choose an anchorage in $5\frac{1}{2}$ fathoms, sand.*

TIDES.—At point Lonsdale it is high water, full amd change, at 9h. 42m. ; springs rise 7 feet ; neaps rise $5\frac{1}{2}$ feet. Within the heads the tides are most irregular ; the narrow entrance to the large basin within, checking the fair course of the tidal wave : hence after southerly gales it may be high water all day, and the contrary with northerly gales.

On the average, it is high water, full and change, at :—

Queenscliff	-	-	at	10 50;	springs rise	3 1;	neaps rise	2 0	
Point Nepean									
Quarantine station									
Dromana bay	-	-	„	2 19	„	2 11	„	2 6	
Schnapper point	-	„	„	2 14	„	2 8	„	2 0	
Ballarine jetty	-	„	„	2 21	„	2 6	„	2 0	
Point Henry and									
Geelong	-	-	„	2 39	„	2 11	„	2 6	
Williamstown	-								
Hobson bay	-	-	„	2 31	„	2 8	„	2 0	
Melbourne quay,									
near the bridge									

The mean water, or half tide level, varies as much as the rise and fall of the tide, it being influenced by the strength and direction of the wind outside the heads. Southerly gales cause an elevation of both high and low water, and northerly gales have a contrary effect ; the latter will sometimes keep back the flood tide for an hour, or even $1\frac{1}{2}$ hours later than the time by calculation.

Tide Streams.—Set of the Flood.—The flood stream comes from the southward and eastward, increasing in strength as it nears the heads, setting right into the entrance, across and through the reefs, with great force, spreading towards Shortland bluff and point King. The stream decreases in strength as it enters the channels, setting towards Swan point and through the West channel in an oblique direction, tending towards Coles channel and Indented head ; and above the West Channel light-vessel, to the N.W. across Prince George bank ; spreading from thence towards Geelong, point Cook, and Hobson bay. In the South channel the flood stream sets to the E.N.E., across the Middle ground, through Pinnacle channel, and spreads along the eastern shore towards Hobson bay.

* See page 209.

Set of the Ebb Stream.—The ebb sets out of Hobson bay south-eastward for a few miles, when it takes a more southerly direction, toward Prince George bank; thence tending obliquely through the various channels, the stream from Symonds channel joining and turning that of the West channel below the Royal George buoy, setting away towards the bight between Shortland bluff and point Lonsdale, and from thence out through the heads, with great force; the body of the stream setting *athwart* the entrance towards Nepean point, and away to the S.E., along the land and in to the shore between Nepean point and cape Schanck.

Between the heads the stream runs from 5 to 7 knots; in the West and South channels between 2 and 3 knots; and about $1\frac{1}{2}$ knots in the broad space above the channels. In Hobson bay during the winter months, there is always a surface current running out, owing to the freshes from the river Yarra; this current frequently sets along both sides of the bay, at the rate of 2 knots. The stream is weak in Geelong bay, except in the ship-channel, where it sets $2\frac{1}{2}$ knots across the bar and becomes weaker as it spreads over the Inner harbour of Geelong.

MOORING.—All vessels in Hobson bay and Geelong harbour must moor with two anchors, for which purpose every vessel should be provided with a strong mooring swivel.

WHARFAGE.—Within the port of Melbourne, including Sandridge and Williamstown, there is wharfage accommodation for 85 vessels of different sizes and draught, to lie afloat, each having a quay berth at the same time, where cargo is taken out of vessels, according to its nature, at the rate of 60 to 200 tons per day:—

Melbourne	-	36	vessels of 100 to 400 tons; greatest draught, 12 ft.
Sandridge	-	10	„ 100 to 1,400 „ „ 19 „
Melbourne and Hobson bay Railway pier	}	15	„ 100 to 2,000 „ „ 21 „
Williamstown Railway pier	}	20	„ 100 to 2,000 „ „ 22 „
Williamstown pier	}	4	„ 100 to 200 „ „ 10 „

A farther extension of wharfage room at Sandridge and Melbourne has been carried on, and some idea of the present accommodation within the port of Melbourne may be gathered from the fact, that at the ordinary rate of discharge, 4,000 tons of merchandize per day can be landed from vessels alongside the wharves.

PATENT SLIPS and FLOATING DOCK.—There are two patent slips and a floating dock in Hobson bay, and one slip on the south bank of Yarra river; so that vessels up to 2,000 tons can have every description

of repairs promptly effected. There are several large foundries in Melbourne and Geelong, where steam-vessels can get any part of their machinery repaired. It is advisable, however, that steamers coming direct from England or America, should be provided with duplicates of such portions of their machinery as may be most liable to give way.

Water.—Vessels in Hobson bay can fill up their water by sending boats under the spout at the Sandridge watering-place, or get supplied by floating tanks.

WATER POLICE.—The water police are quartered on board a vessel in Hobson bay, and at all times row guard amongst the shipping. A signal for their services is the ensign at the main topgallant mast-head by day, and two vertical lights, five feet apart, at the mast-head, by night.

LIFE-BOATS, built at Williamstown by the Government, on Peake's principle, are stationed at the entrance of Port Phillip, Warrnambool, Port Fairy, Portland bay, and at Port Albert, to the eastward. The boats are fully equipped, and are manned by volunteer crews. The life-boat stations are also supplied with the rocket and mortar apparatus; for the use of which see the directions at page 54.

SIGNALS.—The following signals are in use at the ports of Melbourne and Geelong :—

Mails on board	-	{ White flag at the fore, to be kept flying till the mails are landed.
Gunpowder on board		Union jack at the main.
Government immi- grants on board	-	{ Ensign at the mizen-head.
Sea pilot -	-	Union jack at the fore topgallant mast-head.
Harbour pilot -	-	Ensign at the fore topgallant mast-head.
Boarding officer	-	Blue flag at the main, to be kept up till cleared.
Medical assistance	-	No. 5 at the peak.
Water police -	-	{ Day signal, Ensign at the main topgallant mast-head; by night, two vertical lights, five feet apart, at the mast-head or peak.
Customs boat -	-	Union jack at the peak.
Steam tug -	-	Rendezvous flag at the peak or mizen-mast.
Clearing officer, out- wards -	-	{ White flag at the main.

TIME BALL.—A black time ball is dropped daily, Sundays excepted, from a staff on the top of the old light-house at point Gellibrand, at one o'clock, mean solar time. The time is given from the same place at 8 p.m. by the obscuration of a powerful light, at two minutes before 8 p.m.; the instant of the reappearance of the light is the true time. The errors of both signals, if any, are published on the following day in the daily papers.

GEOGRAPHICAL POSITION.—The old light-house stands in lat. $37^{\circ} 52' 10''$ S., long. $144^{\circ} 54' 55''$ E., or 9h. 39m. 39.66s.

ADJUSTMENT of COMPASSES.—Six buoys are moored in Hobson bay for the convenience of vessels swinging to ascertain the error of their compasses. It must be observed that the deviation of compasses is not confined alone to iron vessels, but that a greater amount of local attraction exists in vessels built of wood than is generally believed; and that many casualties attributed to currents, &c., may with greater justice, be traced to compass deviation. Vessels have the use of the buoys free of charge on application to the Chief Harbour master.

There are several compass adjusters, who, if required, swing the vessel and furnish tables of deviation, for which they make a small charge. Commanders swinging their own vessels, should take them to the buoys as nearly in their sea-going trim as possible; anchors and chains in their usual places, boats hoisted up, &c.; and in the case of steamers, have their steam up.

Make the vessel fast amidships to the central buoy; then warp her gradually round, steadying her head exactly on each point of the compass, observing on each point, with an azimuth or standard compass, the exact bearing of one of the under-mentioned objects—the more distant one the better: the difference between the real magnetic bearing of which and each of the respective bearings observed by the azimuth compass, will give the deviation for each point due to the attraction of the ship's iron; the deviation being East when the north end of the needle is drawn to the eastward, and West when drawn to the westward.

Real Magnetic bearings from Central Buoy.—Point Gellibrand light-house, S. $10^{\circ} 58'$ W.; fall of mount Macedon, N. $30^{\circ} 43'$ W.; spire of Wesleyan chapel, Melbourne, N. $48^{\circ} 19'$ E.

BAROMETERS.—With the view of enabling commanders to test the accuracy of their barometers, the Government Astronomer issues daily in the newspapers, a notice from the Willimstown Observatory, showing the height of the standard barometer for the previous day, a comparison with which and the height of the vessel's barometer—the altitude being the same—will show the error, if any. The attention of masters of vessels is specially invited to this notice, as it is evident that the value of meteorological data, collected by different vessels, will be materially enhanced by the barometer readings agreeing with the standard.

SHIPS' LOG-BOOKS.—The chief of the Melbourne Magnetic Observatory, invites commanders of vessels to deposit their log-books with him for a few days, to enable him to glean facts important to nautical science, for the purpose of constructing wind and current charts of these coasts. The immigration officer will take charge of any log-books for transmission to the Observatory, and return them within four days.

PORT REGULATIONS.—QUARANTINE.—Masters of vessels arriving, to report to the pilot the places at which they loaded and touched, and to answer all questions respecting the health of the crew and passengers, under penalty of 100*l*.

The pilot is to give notice to the master if the vessel is liable to quarantine, whereupon he shall hoist a yellow flag, under penalty on the master of 100*l*.

Pilots conducting vessels liable to quarantine to any place not specially appointed for such vessels, liable to a penalty of 200*l*.

A master refusing to deliver to the superintendent of the quarantine station the bill of health, manifest, &c., liable to a penalty of 100*l*.

A master quitting, or suffering persons to quit, his vessel, if liable to quarantine, or not conveying such vessel to the place appointed, liable to a penalty of 400*l*.

Persons quitting such vessels liable to a penalty of 300*l*. and six months' imprisonment.

And all persons neglecting duty, damaging goods, or landing, receiving, or secreting goods, &c., from vessels liable to, and actually performing, quarantine, are subject to penalties varying from 100*l*. to 500*l*.

All vessels from other than Australian ports, must undergo an examination at the Heads by the health officer.

Mails.—All letters and mail-bags on board must be delivered immediately on arrival to the mail-boat; those for Geelong will be taken out of the vessel at Shortland bluff by the Customs boat. A penalty of 5*l*. is inflicted for every letter or newspaper detained. This regulation applies to passengers as well as masters of vessels.

Gunpowder.—All vessels arriving in the ports of Victoria having more than 20 pounds of gunpowder on board, shall hoist the Union jack at the main, and remain at anchor at the appointed place until such gunpowder be landed. Twenty-four hours are allowed, after anchoring, for landing what gunpowder there may be on board, at the appointed magazine. Gunpowder to be landed or removed only between sunrise and sunset; and at the expense of the proprietor or importer, under the supervision of the inspector of the water police, who upon application sends an officer in charge of the powder-boat.

Gunpowder anchorages.—No vessel having more than 20 pounds of gunpowder on board, arriving in or off any of the under-mentioned ports of Victoria, shall be permitted to anchor within the limits herein-after specified, viz. :—

Port of Melbourne, within three-quarters of a mile of point Gellibrand; nor to the northward of a line bearing East from the light-vessel.

Geelong, Outer harbour, within two miles of the shore; nor to the northward of a line bearing East from point Henry.

Geelong, Inner harbour ; within three-quarters of a mile of Limeburners point ; nor to the westward of a line bearing N.N.W. from the powder magazine.

Portland bay, within three-quarters of a mile of the shore ; nor to the northward of a line bearing East from the light-house.

Port Fairy, within three-quarters of a mile of the shore ; nor to the westward of a line bearing N.N.E. from the light-house.

Port Warrnambool, within half a mile of the shore ; nor to the westward of a line bearing S.S.W. from the beach light-house.

Port Albert, within 2 miles of the wharves ; nor to the northward of Sandy island.

Customs.—No communication is permitted with the shore from inward bound vessels ; nor can any person be allowed on board until the Hobson Bay boarding officer has cleared the vessel, except the reporters for the press, who, in order to facilitate the speedy transmission of important intelligence, have special permission to board and land from vessels before such are cleared by the boarding officer.

Vessels' cargoes and stores to be reported at the Custom-house within 24 hours after arrival, and before bulk be broken ; or the master shall forfeit a sum not exceeding 100*l.*, nor less than 20*l.*

All masters, pilots, or other persons in charge of vessels entering any port of this colony shall, as they approach the anchorage, hoist their number or distinguishing flag, until answered by the signal-stations ; after which they must hoist the number of the port they are from, which will be answered in a similar manner. Vessels arriving after sunset must hoist their signals the following morning, within two hours after sunrise. Such vessels as are not provided with Marryat's code or a distinguishing flag, are to adopt some other distinguishing flag, and communicate the same to the harbour master.

After a vessel has cleared outwards at the Customs, her clearance and papers are transmitted to the immigration officer, who goes on board and examines if all the requirements of the Passengers Act have been carried out, and grants her clearance accordingly.

Passengers to be supplied with sufficient food, &c., under penalty of 20*l.* ; and masters neglecting to maintain passengers 48 hours after arrival, taking down berths, refusing or neglecting to show the list of passengers, or permitting passengers illegally to leave the vessel, are liable to a penalty of 20*l.*

Seamen.—Vessels or houses may be searched for run-away seamen ; those harbouring them are subject to a penalty of 50*l.*, and persons obstructing or resisting the search for seamen are liable to two years' imprisonment.

Convicts.—The master of a coasting vessel conveying convicts into the

colony of Victoria, is subject to a penalty of 100*l.* or six months' imprisonment, or both; any person harbouring or concealing any offender illegally at large, is liable to a penalty of 50*l.* or six months' imprisonment.

Damaging buoys, &c.—Any person damaging light-vessels, buoys, or beacons, is liable to a penalty of 100*l.* to 20*l.*

PORT CHARGES.—There is a duty of one shilling per ton, which is levied once every six months upon all vessels arriving within Victoria.

Rates of Pilotage for Port Phillip, Port Albert, and Portland bay:—

Port Phillip.	Sailing vessels and Steamers under sail only			Steamers and Vessels towed by Steam.		
	Per ton.	Maximum.	Minimum.	Per ton.	Maximum.	Minimum.
1. From without the heads to Melbourne or Geelong; and the reverse.	6½	50	6 0	4½	34 10	4 0
2. From within the heads to Melbourne or Geelong.	4	31	3 10	3	23 0	2 10
3. From without the heads to outer anchorage, Hobson bay,* or anchorage at point Henry; and the reverse.	5½	42	4 15	3½	27 0	3 0
4. From within the heads to outer anchorage, Hobson bay, or anchorage at point Henry.	3	23	3 10	2½	19 0	2 5
5. From without the heads to any anchorage within the heads and below the channels; and the reverse.	2½	19	2 5	1½	11 10	1 10
6. From Melbourne to point Henry; and the reverse.	2½	19	2 5	1½	11 10	1 10
7. From Melbourne to Geelong; and the reverse.	3½	27	3 0	2½	19 0	2 5
8. For each remove from one place of anchorage to another in Hobson bay or Geelong harbour.	1	8	1 0	1	6 0	1 0
9. From Hobson bay to Melbourne; and the reverse.	2½	5	2 0	1½	3 0	1 5
10. From point Henry to Geelong Inner harbour; and the reverse.	2½	7	1 10	1½	5 0	1 5
Outports.—Port Albert, in or out.	-	3	24	3 0	2½	16 0
„ Portland bay, in or out.	-	2½	16	2 0	1½	11 0

Vessels forced back after having been piloted out to sea, pay one-half of the above rates. Such sailing vessels as may employ a steam-tug for any intermediate distance to those above enumerated will be allowed, if considered just, a proportionate reduction of the rates of pilotage, on a reference to the Pilot board.

Exemptions.—All vessels under 50 tons; all vessels belonging to Her Majesty; all vessels outfitting or refitting from the fisheries; all vessels employed in the coasting trade; all vessels regularly trading between any port of Victoria and any of the other Australian Colonies, including New

* N.B.—A line from Point Gelibrand old light-house, running N.E. by E. through the St. Kilda white buoy, divides the inner from the outer anchorage of Hobson bay.

Zealand, the master of any such vessel holding a certificate from the Pilot board that he is competent to act as pilot to such vessel, unless the services of a pilot shall have been actually received; and all vessels not having actually received the services of a pilot.

REMARKS.—MELBOURNE.—Few cities can boast of so rapid a rise as Melbourne. In 1835 its first founders, Messrs. Batman and Fawkner, settled here. By the census of 1841 its population was 4,440; by that of 1846 it was 10,945; and by that of 1851, two months before the gold discoveries, it was 23,143.

Melbourne is regularly planned with broad straight streets at right angles to each other, and has many handsome public buildings. Its secure port and central position, with the net-work of railways and rivers connecting Melbourne with a large portion of Southern Australia, seem destined to command for it the chief export and import trade of an immense pastoral and agricultural district, independently of the demands of the gold fields, in which new discoveries of great value continue to be made.

By the census of 1861 the population of Melbourne and its suburbs, within a circuit of 5 miles, was 117,778. By custom-house returns for 1862, the value of its imports in that year amounted to 12,896,250*l.*; its exports to 11,615,071*l.*; the revenue of the port to 1,130,757*l.* The principal articles of import are manufactured goods of all kinds, provisions, machinery, railway materials, coal, timber, wine, spirits, &c. The principal exports are gold, live stock, hides, wine, timber, and wool.

The number of sailing vessels belonging to the port was 393; aggregate tonnage, 54,009 tons; the largest vessel, 910 tons. The number of steam vessels, 28; their aggregate tonnage, 3,544 tons, the largest being 605 tons. The number of registered seamen was 12,384. The number of vessels entered during the year, exclusive of coasting vessels, was 1,489; aggregate tonnage, 522,832 tons; the largest vessel, 2,605 tons. The number of vessels cleared outwards during the year was 1,513; aggregate tonnage, 53,417 tons.

The principal trade appears to be with the United Kingdom; this is between two and three times that of foreign countries. The inter-colonial trade is about half that with Great Britain and Ireland.

GEELONG has broad straight streets at right angles with each other, with large public buildings. Its population by the census of 1861, was 23,253. The value of imports in 1862, was 390,689*l.*, exports, 1,047,619*l.*; and the revenue, 130,065*l.* The number of sailing vessels belonging to the port was 22; aggregate tonnage, 1,825 tons; the largest sailing vessel, 255 tons; number of seamen, 551.

The chief articles of import are provisions, coal, grain, spirits, and timber. The chief exports, wool, gold, leather, sheep and horses. The principal trade is with the United Kingdom and inter-colonial.

CHAPTER V.

AUSTRALIA.—SOUTH COAST, PORT PHILLIP TO CAPE HOWE.—BASS STRAIT.

VARIATION from $8^{\circ} 15'$ to $10^{\circ} 30'$ East, in 1868.

The **NORTHERN COAST** of **BASS STRAIT** from Nepean point extends S.E. $\frac{3}{4}$ E. 16 miles to cape Schanck, and may be approached to 1 mile in 8 to 16 fathoms. The most elevated hill along it is 433 feet high, at North 2 miles from the cape. There is telegraphic communication between cape Schanck and Melbourne.*

CAPE SCHANCK, the southern extremity of the peninsula which separates Port Phillip from Port Western, is a narrow cliffy head 278 feet high, close off which is the remarkable Pulpit rock, with a smaller rock lying S. by E. nearly a quarter of a mile from the cape.†

LIGHT.—The light-house on cape Schanck is a *white* circular stone tower, about 50 feet high, and exhibits at the height of 328 feet above the sea, a fixed light, flashing every two minutes, visible 23 miles off, between the bearings of W. $\frac{1}{4}$ N. and S.E. $\frac{3}{4}$ E. When within 6 miles of the light, the eclipses will be scarcely observable, and a faint light will be seen between the flashes.

It will always be desirable for vessels to get sight of cape Schanck before they run far into the great bight for Port Phillip; and if the wind blows strong from the southward, it will be unsafe to run without having seen it. The cape is also an excellent mark for vessels desirous to go into Port Western, the western and principal entrance of which lies between 7 and 10 miles to the eastward of the cape.

On the east side of cape Schanck a rocky bight extends E. by N. $\frac{1}{2}$ N. $1\frac{1}{2}$ miles to Barker point; and at half a mile to the W.N.W. of the point is a small stream of fresh water. From Barker point the coast, which is closely bordered with rocks, trends E. by N. $\frac{1}{2}$ N. $5\frac{1}{2}$ miles to West head, a cliffy projection enclosed by reefs, with a 10-foot rock lying S.E. two-thirds of a mile from it; this head forms the western point of the West entrance into Port Western.

* See Charts of Bass strait, Nos. 1,695 and 1695A; scale, $m = 0.20$ of an inch.

† See Plan of Port Western, No. 1,707; scale, $m = 1$ inch.

PORT WESTERN is an extensive bay, protected from the sea by Phillip island, between the west point of which and West head is the West entrance to the port; the East entrance being a narrow channel separating the east end of the island from a projecting point of the main-land, to the eastward.

The northern shore of Port Western, from West head, curves N.N.E. $\frac{1}{2}$ E. $7\frac{1}{2}$ miles, and from thence E. $\frac{3}{4}$ S. 5 miles to Sandy point, forming a bight, the north-eastern and greatest portion of which is occupied by shoal water, thickly strewed with knolls, extending from the shore to Middle bank, which trends S.W. by W. $\frac{1}{2}$ W. 5 miles, and S.S.W. 2 miles from Sandy point. Between the south-west spit of this bank and West head there are 4 to 10 fathoms.

GRANT POINT, E. by S. $\frac{1}{2}$ S. $4\frac{1}{2}$ miles from West head, is a craggy projection, forming the west extreme of Phillip island, and has a reef extending W.S.W. a quarter of a mile to Round islet. At S.W. $\frac{1}{2}$ S. three-quarters of a mile from this islet is Black rock, which is 10 feet above high water and fringed by a reef, between which and Round islet is a passage with $5\frac{1}{2}$ to 7 fathoms water, available for small craft, on an emergency.

The southern shore of Port Western, from Grant point, trends N.N.E. 1 mile to the rocky south-west point of Cat bay; reefs project a quarter of a mile from this shore and from the south side of the bay. From the bight of this little bay the northern coast of Phillip island sweeps round N.E. and eastward $9\frac{1}{2}$ miles to Observation point, the north-east extreme of the island; for the first $4\frac{1}{2}$ miles it is bordered by reefs, and from thence to the point it is steep and sandy: none of these reefs project beyond a quarter of a mile from the shore.

OBSERVATION POINT, which is low, broken, and swampy, is separated from the higher land to the southward of it, by a shallow creek, barely 2 cables wide at its mouth, from whence it branches to the south-westward.

THE WEST ENTRANCE of Port Western, which lies between West head and Grant point, is $3\frac{1}{2}$ miles wide, between Black rock and the 10-feet rock off West head, with 16 fathoms in mid-channel, and 5 to 6 fathoms close to the rocks on either side; and being open and free from any other hidden danger, it is easy of access, and affords sufficient room for a vessel of any size to work in or out. From 4 miles within the entrance a clear channel $1\frac{1}{4}$ to $1\frac{1}{2}$ miles wide, with 6 to 17 fathoms water, extends N.E. $\frac{3}{4}$ E., between Phillip island and Middle bank, to abreast of Sandy point, where the port divides into two arms, one trending North and the other East.

TORTOISE HEAD, E. by N. $\frac{1}{4}$ N. $1\frac{3}{4}$ miles from Sandy point, is the south end of a table-topped isle nearly 1 mile long, with a low point projecting from its west side: reefs extend a quarter of a mile from this and the head, and a spit, with 13 feet water on it, projects S.W. three-quarters of a mile from the latter.

FRENCH ISLAND, on the north side of the eastern part of Port Western, is 11 miles long, East and West, and 7 miles broad at its west end, from whence it narrows to 4 miles toward Spit point, the east extreme of the island. The southern and greater portion of the island is hilly; but the north-western part and northern shore are low and marshy. From the south-west extreme of French island its southern coast trends E. by S. $\frac{1}{2}$ S. $3\frac{3}{4}$ miles to its south point; between this and Finger point, at N.E. $\frac{3}{4}$ E. 2 miles from it, is a shoal bight, in the entrance of which is Elizabeth isle, 60 feet high.

The bight formed between Tortoise head and the south point of French island, and that from thence to Finger point, are filled with mud-flats having 1 to 5 feet on them at high water, ordinary springs, with navigable creeks reaching in to the shore. From a 15-feet spit, marked by a buoy, at S.S.W. $\frac{1}{2}$ W. $1\frac{1}{4}$ miles from Tortoise head, the 5-fathoms edge of the bank, which is mostly covered by these mud-flats, trends East 4 miles, and then sweeps round close outside Elizabeth isle, to Finger point.

THE NORTH ARM of Port Western is $1\frac{1}{4}$ miles wide, between Sandy point and the spit $1\frac{1}{4}$ miles S.S.W. of Tortoise head; and from its entrance trends N. $\frac{1}{2}$ W. 10 miles to Watson inlet, with increasing width to 4 miles between the north point of French island and the western shore. The channel of the North arm is on the west side, between the mud-flat which projects 1 to 4 cables' lengths from the shore, and the banks which extend a quarter of a mile to 2 miles from the west side of French island. This channel is three-quarters of a mile to 1 mile wide, with 11 to 6 fathoms water, from the entrance to abreast of the north point of the island. The banks on the east side of the arm are separated from the west coast of French island by a passage about one-third of a mile wide, with $3\frac{1}{2}$ to 8 fathoms water in it, but it is encumbered with shoal patches.

HASTINGS.—At N.W. by N. 2 miles from Sandy point is a shoal inlet; and between Crib point, at N. by W. $\frac{3}{4}$ W. 4 miles, and Long islet, N. by W. $\frac{1}{4}$ W. 6 miles from Sandy point, the low western shore forms a bight, in the southern part of which is Sandstone isle, lying N.N.W. $1\frac{1}{4}$ miles from Crib point. This bight is filled by a flat, intersected by creeks, the largest of which, from half a mile north-eastward of Sandstone isle, winds north-westward about $1\frac{1}{2}$ miles to the town of Hastings: this creek is marked by beacons, and has irregular depths of 1 to 5 fathoms.

At $2\frac{1}{2}$ and at $4\frac{1}{2}$ miles northward of Sandy point 4-fathoms shoals project half a mile from the bank which borders the western shore; and there are several shoal patches N.W. of the north point of French island, that on the northern side of the fairway being Eagle rock, which is marked by a beacon, standing N.W. by N. $1\frac{1}{4}$ miles from the point.

Between the north point of French island and Quail island, $2\frac{1}{2}$ miles to the northward of it, the North arm turns eastward into a sheet of water extending 9 miles East and West, and 4 miles across, between the north side of French island and the low main-land to the northward and eastward, the north shore being intersected by numerous creeks and inlets. This sheet of water is occupied by a mud-flat, with 6 to 8 feet on it at high water, ordinary springs, and numerous channels branching into it from the North arm. There are 13 to 4 fathoms for about 4 miles into the flat from Eagle rock; but few of the smaller branches of this navigable water carry 6 feet water to within half a mile of the low woody shores.

THE EAST ARM of Port Western, between the north side of Phillip island and the bank which extends from the south shore of French island, is $1\frac{1}{4}$ miles wide, with regular soundings in 7 to 9 fathoms. At 1 mile North of Observation point is the west point of a narrow spit, with 12 to 6 feet water on it, projecting W.S.W. and West $2\frac{3}{4}$ miles from the shoal flat which nearly fills the eastern end of Port Western. Between this spit and the north-east extreme of Phillip island there is a bight in the shoal flat, extending 2 miles East and West, and 1 mile across, where vessels may anchor in 6 to 8 fathoms sand and shells. From the west point of the spit the northern branch of the East arm sweeps round eastward and north-eastward past Finger point, and is two-thirds of a mile to half a mile wide, with $4\frac{1}{2}$ to 11 fathoms water between the banks, which border the south coast of French island, and the shoal flat that fills the east end of the port.

SETTLEMENT POINT, E. $\frac{3}{4}$ N. $1\frac{1}{2}$ miles from Finger point, is a rocky projection of the main-land, between which and the south-east extreme of French island, at W.N.W. $1\frac{1}{4}$ miles from it, are Pelican islet and Schnapper shoal, the latter marked by a beacon. The islet lies W. by N. half a mile from Settlement point, with which it is connected by a reef; and the shoal, which lies between Pelican islet and French island, divides the East arm into two narrow channels with only $3\frac{1}{4}$ to 4 fathoms water.

From Settlement point the coast trends E. $\frac{3}{4}$ N. $3\frac{1}{4}$ miles to Queensferry, between which and Passage point, at 1 mile N.E. of the east point of French island, is a bight 2 miles deep, forming between it and the island a sheet of water $2\frac{1}{2}$ to $3\frac{1}{2}$ miles wide, the south-eastern and greater portion being filled by mud-flats, having 6 to 9 feet on them at high-water, ordinary springs. The East arm branches into this space and round the east point

of French island, much as the North arm does into the mud-flat North of the island.

DIRECTIONS.—The tide-streams always raise a sufficient ripple to break on the banks which form the north-west side of the main channel, giving timely notice of the shoal water on that side; but if this cannot be trusted, steer for Tortoise head, bearing N.E. $\frac{3}{4}$ E., and well open of the north-west point of Phillip island, to avoid the reef which projects from it. The northern coast of the island, although bold, should not be approached within half a mile, as the tide-streams set along it with great velocity, and may, in light winds, sweep a vessel too near the shore. Having arrived abreast of Sandy point, proceed northward or eastward up the North or East arm, according to destination: there is good anchorage in 8 fathoms, at half a mile off Observation point.

PHILLIP ISLAND is 12 miles long, and $4\frac{3}{4}$ miles across, at its western, and broadest part; the eastern end of the island being a peninsula, connected with the western part by an isthmus half a mile broad, at $8\frac{1}{2}$ miles eastward of Grant point. From Grant point the irregular and rocky south coast of the island curves East 5 miles to a point, close off which is the high needle-shaped Pyramid rock. Quoin hill, N.E. by E. $\frac{1}{2}$ E. $3\frac{1}{4}$ miles from Grant point, is 218 feet high.

Between Pyramid rock and Wollamai head, E. by S. 7 miles from it, the coast forms a bay 2 miles deep, affording anchorage at about 1 mile north-eastward of Pyramid rock, sheltered from north-west and northerly winds. The northern shore of the bay consists of a range of low sand-hills covered with scrub, and is bordered by reefs, none of which appear to extend beyond one-third of a mile from the shore.

WOLLAMAI HEAD, the south-east extreme of Phillip island, is a remarkable helmet-shaped granite headland, of a reddish colour, rising abruptly from the sea to the height of 332 feet, from whence it slopes towards the N.W., forming a peninsula nearly $1\frac{1}{2}$ miles long, N.W. by N. and S.E. by S., and three-quarters of a mile broad. This head is the more conspicuous from its being the highest land on Phillip island, all the remaining portion of it being covered with low hills, clothed in an almost impervious scrub. The cape is fringed with dry and covered rocks; but none extending beyond a quarter of a mile from the shore.

RED POINT, North 1 mile from the south-east point of Wollamai head, is a mass of red granite boulders, 50 feet high, and is marked by a *black* beacon standing 40 feet from the water's edge.

WOODY POINT.—Between Red point and Woody point, at N. $\frac{3}{4}$ W. 2 miles from it, the east end of Phillip island forms a bay nearly $1\frac{1}{4}$ miles deep, with rocky points and sandy beaches, bordered by a bank, of which

the 3-fathoms edge projects 1 cable's length to half a mile from the shore, the edge being marked by *black* beacons, one at N.W. $\frac{1}{2}$ W. half a mile from Red point, and the other two near Woody point.

The north-east coast of Phillip island, between Woody point and the bluff, close to the south-eastward of Observation point, forms a bay 2 miles deep, divided by a broad projection, into two bights, that to the southward being Swan corner. Churchill isle, between 1 and 2 miles N.W. by W. of Woody point, is one-third of a mile broad at its north-west end.

This bay is filled by a mud-flat, partly dry at low water, the outer edge of which, from Woody point, trends N.N.E. $\frac{1}{2}$ E. $1\frac{1}{4}$ miles to a spit, marked by a buoy, and from thence N.W. by W. $4\frac{1}{2}$ miles to Observation point. This mud-flat is intersected by several creeks, the largest of which, from its entrance, at three-quarters of a mile S.E. by E. of Observation point, trends S.E. by S. and S.S.W. 3 miles, carrying 3 to 6 and 2 fathoms to within half a mile from the shore of Swan corner.

The EAST ENTRANCE into Port Western is available at high water for vessels of 12 feet draught; and vessels drawing 18 feet, seeking shelter, and unable to fetch the West entrance, need not lose ground by running back eastward, round Wilson promontory, but may find anchorage within the entrance, at a quarter of a mile inside Red point, sheltered from all winds except south-east gales.

The outer heads of the entrance are Red point, already described, and Griffith point, N.N.E. $\frac{1}{2}$ E. nearly 1 mile from it. Griffith point is a bold sandstone bluff 70 feet high, and bare of trees for some distance inland, and fringed by a reef. From Griffith point the coast trends N.W. by N. $1\frac{1}{4}$ miles to Davis point, which is low, sandy, and wooded to the water's edge, with a pillar beacon on it, surmounted by a *white* ball. Between this and Woody point, a quarter of a mile to the northward of it, are the Narrows.

An extensive bank, with dry patches on it, and only 4 feet water over most parts of it, projects about 1 mile from the coast between Griffith and Davis points; its outer edge being marked by a *white* beacon at 1 mile N.W. of Red point, and a *white* buoy at half a mile North of the beacon. From this buoy the edge of the bank trends north-eastward to Davis point, at 1 cable's length off which is a *red* buoy, moored in the Narrows. In bad weather, especially during the ebb, the sea breaks over the edge of the bank.

The EAST ENTRANCE CHANNEL, which lies between the bank just described, and that which borders the western shore, is 1 to 3 cables wide, with 5 to $4\frac{1}{2}$ fathoms for one-third of a mile above Red point. From

the first *black* beacon to the Narrows the channel varies from 100 to 300 yards in width, with $3\frac{1}{4}$ to 5 fathoms, and 6 fathoms in the Narrows.

ANCHORAGE.—From 8 fathoms off the south-east extreme of Wollamai head the soundings decrease gradually, towards the East entrance, close within which is the outer anchorage, in 3 to 4 fathoms, sand, between Red point and the first *black* beacon. Vessels of 12 feet draught, may bring up in the inner anchorage, between the first *black* beacon and the Narrows, in 15 to 20 feet water, sand and mud. The most convenient anchorage is between the *white* buoy and Davis point, where the channel, being above 3 cables wide, affords more room for getting under way. As the streams run through the channel with great force, it is advisable for vessels at anchor, to lay out a kedge to keep them from fouling their anchors.

From the Narrows into port, the passage through the banks, which has only 7 to 12 feet water, leads N.N.E. $\frac{1}{4}$ E. from the east side of the beacon off Woody point, to the east side of the buoy at N.N.E. $\frac{1}{4}$ E. 1 mile from the point, passing a cable's length West of the intermediate *red* buoy.

DIRECTIONS.—After rounding the south-east extreme of Wollamai head haul in for Red point, passing it within a cable's length, until it bears S.W., when, if desired, a vessel may anchor between it and the first *black* beacon. From the outer anchorage pass midway between the beacon and the eastern bank, where the channel is only 100 yards wide, and then steer N.W. half a mile, keeping the *white* beacon on the starboard bow ; give it a berth of half a cable's length ; and if not intending to anchor in the channel, follow its course to the northward and north-eastward, leaving the *white* buoy on the starboard, and the *black* beacons on the port hand. From the Narrows steer N.N.E. $\frac{1}{4}$ E., leaving the *black* beacons and buoy on the port, and the intermediate *red* buoy on the starboard hand, and having cleared the channel, the vessel may proceed according to her destination.

Vessels of 12 feet draught, bound into Port Western by the East entrance, should wait in the inner anchorage till nearly slack water, as the stream runs with great force through the Narrows.

From Port Western out to Sea.—From the east side of the buoy, at N.N.E. $\frac{1}{4}$ E. of Woody point, steer S.S.W. $\frac{1}{4}$ W. through the Narrows, leaving the *black* beacons on the starboard, and the *white* buoy on the port hand: from the *white* buoy, haul out South for half a mile, leaving the *white* beacon on the port hand, and then steer about S.E. by E. out to sea, passing the southernmost *black* beacon also on the starboard side.

EAST SHORE of PORT WESTERN.—From Davis point the shore forms a bay extending N.N.E. $3\frac{1}{4}$ miles to Reef islet, which is surrounded with rocks, that also connect it with the low north-east point of the bay.

This bay is nearly 2 miles deep; but it is shallow throughout, there being only 6 to 12 feet water across its entrance from point to point.

MAGGIE SHOAL.—BASS RIVER.—The bank which mostly fills the bay, projects to a 4-feet spit, close off which is Maggie shoal, with a buoy on it, lying N.E. by N. 2 miles from Davis point. Bass river is a small stream winding through the low marshy land into the bay at E. $\frac{3}{4}$ N. 2 miles from Maggie shoal.

Between Reef islet and Settlement point, at North $3\frac{3}{4}$ miles from it, the eastern shore of Port Western is divided into two small bays of nearly equal extent, by Cobb bluff, from which a reef projects about a quarter of a mile.

With the exception of the northern branch of the East arm and the bight between Observation point and the spit northward of it, the whole of the eastern part of Port Western is filled by a flat, with rarely more than 3 fathoms water over any part of it.

ASPECT.—The main-land about the eastern end of Port Western is moderately elevated and thinly wooded with short trees; the soil is rich, especially near the banks of Bass river, and is clothed with coarse grass to the water's edge. From the hilly promontory forming the east side of the East entrance, a range of wooded hills stretches away in an East and N.E. direction, River hill, one of the summits of this range, bearing N.E. $\frac{3}{4}$ E., distant 10 miles from Wollamai head, and which is 816 feet high.

Water.—Excellent water can be obtained at all times, at the fisherman's hut, just within Red point.

TIDES.—It is high water S.E. of French island, full and change, at 1h.; springs rise 10 feet, and neaps 8 feet, the latter ranging $6\frac{1}{2}$ feet: North of French island it is high water, full and change, at 1h. 13m.; springs rise $10\frac{3}{4}$ feet, and neaps $8\frac{3}{4}$ feet, the latter ranging $7\frac{1}{2}$ feet. The stream in the main channel, between Phillip island and Middle bank, runs 3 knots, and in the East arm 1 to 2 knots.

At Woody point it is high water, full and change, at 12h. 50m.; springs rise about 8 feet, and neaps 5 feet. The stream runs with great force through the passage, especially between the southernmost *black* beacon and the edge of the sand-bank, and in the Narrows.

SOUTH COAST.—COAL MINES.—The coast from Griffith point forms a slight curve, trending E. $\frac{1}{4}$ S. $4\frac{1}{2}$ miles to Black head, and from thence S.E. by E. $\frac{1}{2}$ E. $2\frac{3}{4}$ miles to Wright river, and after extending S.E. by S. $4\frac{3}{4}$ miles from the river to the Coal mines, it takes a S.E. by E. $\frac{1}{2}$ E. direction 3 miles to the south extreme of cape Paterson. Reefs project a quarter of a mile to half a mile from the intermediate points; and from

Wright river to the cape, a low range of sand-hills extends along the coast.

CAPE PATERSON is a low point, with sand-hillocks scattered over it; breakers extend about half a mile from its western point, and a small dry rock lies about half that distance from the eastern part of the cape, with 16 fathoms at three-quarters of a mile to the southward of it.

POWLET RIVER is a small stream midway between the Coal mines and cape Paterson.

From cape Paterson the coast takes a general E.N.E. direction 7 miles to the mouth of Anderson inlet, which is full of mud-banks and only available for boats; a small river, of which the native name is Toluncan, flows into the south-east end of the inlet. From the mouth of the inlet the coast trends nearly S.E. by S. 17 miles to cape Liptrap, forming between the two capes a bight, $6\frac{1}{2}$ miles deep, formerly known as Venus bay, which is quite exposed to the southward. There appears to be deep water close to the shore, which is mostly sandy, with low rocky points.

SOUNDINGS.—From 25 fathoms at 3 miles off Grant point to 31 fathoms at 4 miles off cape Liptrap, the soundings range from 35 to 54 fathoms, mostly over sandy bottom.

CAPE LIPTRAP is the south-west extremity of a table-topped promontory 200 to 300 feet high, from which a range of wooded hills extends upwards of 20 miles north-eastward. Two rocks lie near the cape, that to the eastward having 4 to 6 fathoms close to it.

PATERSON BAY extends from cape Liptrap nearly E.S.E. 26 miles to the south point of Wilson promontory, close off which is a small rocky islet; the bay is 9 miles deep in its north-western part, and has a shallow lagoon behind the low sandy land at the head of it, the mouth of which lies E.N.E. 13 miles from cape Liptrap. From the mouth of this lagoon the north-eastern shore of the bay trends S.E. $\frac{1}{2}$ S. 6 miles to some low red cliffs, at $1\frac{1}{2}$ miles to the south-westward of which is a small islet. Between the Low Red cliffs and the south point of Wilson promontory there are several small exposed bays, with rocky points between them.

GLENNIE ISLANDS, which lie between $1\frac{1}{2}$ and 5 miles off the coast between the Low Red cliffs and the south point of Wilson promontory, form a conspicuous range, extending from 4 miles southward of the Low Red cliffs, S.S.E. $\frac{1}{2}$ E. 10 miles, to between $2\frac{1}{2}$ and 5 miles W.S.W. from the south point of Wilson promontory, and have deep water close to their rocky shores. They are eight in number, with some smaller rocks among them, and have scarcely a sign of vegetation upon their white surfaces.

The largest of the Glennie islands, which lies W. by N. $\frac{1}{2}$ N. 8 miles from the south point of Wilson promontory, is 2 miles long, N.W. $\frac{1}{2}$ W. and S.E. $\frac{1}{2}$ E., saddle-shaped, and strewn over with blocks of granite, which give it a castellated appearance, the most elevated part being 456 feet high. Three small islets lie close off its south point, and rocks extend nearly half a mile from its northern end. H.M.S. *Beagle* anchored in 20 fathoms, on the east side of the island; but the anchorage was not very good, the bottom being sand over rock. A singular break in the high land of Wilson promontory, bearing E. $\frac{1}{2}$ N., is a distant guide for the anchorage, in which the flood stream sets to the northward, and when aided by the current, runs $1\frac{1}{2}$ knots. There is a passage nearly 4 miles wide, with 23 fathoms, between this part of the group and the mainland.

Cleft isle, the southernmost of the Glennie islands, is of a round form, and remarkable from having two dark caverns on its south side. A reef, with a small islet and rocks on it, extends 1 mile to the south-westward from the island; and the easternmost isle of the group lies 1 mile to the north-eastward of it.

TIDES.—It is high water at the Glennie islands, full and change, at 12h. 20m; rise about 8 feet.

SOUNDINGS.—From 31 fathoms at 4 miles off cape Liptrap to 42 fathoms at 9 miles W.S.W. of Cleft isle, there is no bottom at 35 and 43 fathoms.

WILSON PROMONTORY, the south extremity of Australia, is a lofty peninsula, 22 miles long, North and South, and 8 miles broad at the centre. It is connected with the main-land to the north-westward, by a low sandy neck 10 miles long and 3 to 5 miles broad, which separates Paterson bay from Corner basin, to the north-eastward. This promontory rises to rugged mountains of considerable elevation, tolerably wooded on their upper parts; but towards the shore they are nearly destitute of vegetation, and descend abruptly to the sea. The soil is shallow and generally barren; though the brushwood, dwarf gum trees, and some smaller vegetation, which mostly cover the granite rocks, give the country a deceitful appearance to the eye of a distant observer.

LIGHT.—The light-house which stands on the south-east point of Wilson promontory, at about E.N.E. 2 miles from the south point, is a *white* circular stone tower, exhibiting at the height of 342 feet above the sea, a fixed light visible in clear weather, at the distance of 24 miles, between the bearings of E.N.E. and S.S.W., except when eclipsed by the adjacent islands. When the light bears N.E., vessels may steer directly between Cleft and Rodondo isles for the promontory. From the light-

house the coast trends N. by E. $2\frac{1}{2}$ miles to the south-west point of Waterloo bay : nearly midway lies a small islet close to the shore.

WATERLOO BAY extends from its south-west point N.E. $2\frac{1}{4}$ miles to cape Wellington, the east point of Wilson promontory, and is $1\frac{1}{3}$ miles deep, with 14 fathoms, mud, in the centre, from whence the depth of water decreases to 4 and 3 fathoms at a cable's length from the inner shores of the bay, and increases to 15 fathoms close to the south-west point.*

MOUNT WILSON.—The western shore of Waterloo bay forms the eastern end of a low valley 3 miles long, which stretches across the promontory, showing a very conspicuous break in the high land, mount Wilson, on the north side of the valley, and $3\frac{1}{2}$ miles westward of cape Wellington, rises abruptly till its wooded summit reaches the height of 2,350 feet, and appears to be the highest mountain on the promontory. On the south side of the valley, opposite mount Wilson, is a range of immense granite boulders 1,010 feet high.

CAPE WELLINGTON is a hilly headland, projecting $1\frac{1}{2}$ miles south-eastward from the line of coast; Kersop peak, its most elevated summit, rises to the height of 740 feet, at a mile to the north-westward of the south point of the cape. The bold eastern face of cape Wellington, from its south point, tends nearly one mile northward to a steep headland, between which and Brown head, at a little more than half a mile to the N.N.W. from it, a narrow cove trends between the hills, one-third of a mile in a southerly direction.

REFUGE COVE, W.N.W. half a mile from Brown head, and the only anchorage on this side of Wilson promontory sheltered from the eastward, is the central of three small deep-water bights between Brown head and Horn point, at N. by W. one mile from the head. Hobbs head, half a mile to the southward of Horn point, forms the north side of the entrance of Refuge cove, which is only $1\frac{1}{2}$ cables wide, but may be easily recognised from its lying less than a mile northward of Kersop peak, and from its having the first sandy beach that opens North of cape Wellington. This cove is about one-third of a mile in extent, with 8 fathoms in the entrance, from which the depth decreases to 3 and 4 fathoms at half a cable's length from the shore. In 1842, there was a whaling establishment in the south-east corner of the cove.

The bight between Brown head and Refuge cove trends about one-third of a mile to the southward, with 9 to 5 fathoms, and that between Hobbs head and Horn point has the same depth of water; but is open to the eastward.

* See Chart of Corner inlet, No. 1,703; scale, $m = 1$ inch.

TIDES.—It is high water in Refuge cove, full and change, at 12h. 5m.; rise, 8 feet. At a mile in the offing the northern and ebb stream commences at twenty-five minutes before high water, and runs from 1 to 2 knots. Past the south end of Wilson promontory the same stream sweeps round from the westward, sometimes at the rate of $2\frac{1}{2}$ knots.

SEALERS COVE.—From Horn point the coast trends W. $\frac{1}{2}$ N. $1\frac{1}{2}$ miles to the southern point of Sealers cove, which is nearly three-quarters of a mile wide, N. by W. and S. by E., at its entrance, and about one mile in extent within it. There are 5 fathoms across the entrance, inside which the greatest depth is $3\frac{1}{2}$ fathoms, with space enough for small vessels only; it is exposed to the north-eastward; from which quarter, however, the wind seldom blows with sufficient strength to raise a heavy sea.

Water is abundant in Refuge cove, and on account of the perfect shelter which the cove affords from all westerly winds, it is much used by the small vessels and boats, which frequent the neighbouring islands for seals.

FIVE MILE BEACH.—From Sealers cove the coast trends nearly N.N.W. $1\frac{1}{2}$ miles to the south end of Five Mile beach, which from thence forms a slight curve, extending nearly N. by E. $\frac{1}{2}$ E. $4\frac{1}{4}$ miles, and is intersected at each end by a stream of fresh water. The beach may be approached to two-thirds of a mile, in 5 to 7 fathoms.

Between the north end of Five Mile beach and $2\frac{1}{2}$ miles to the N. by W. from it, the coast forms four points, one of which, at half a mile to the north-eastward of the beach, has two rocks above water, close to the south-eastward of it, with 2 and 3 fathoms between the point and the rocks.

RABBIT ISLE, nearly E.N.E. $1\frac{3}{4}$ miles from the north end of Five Mile beach, and so named from the number of rabbits on it, is nearly half a mile long, N.E. and S.W., and being 200 feet high, is an excellent mark for vessels proceeding northward for Corner inlet.

Wood and Water.—At about a mile northward from the island, and nearly the same distance from the main-land, a vessel may anchor in 4 fathoms, abreast of a good watering and wooding-place. It is not, however, sheltered from easterly winds. To the westward of the watering place the land rises to Round Backed hill, which bears W.N.W. distant $3\frac{1}{2}$ miles from Rabbit isle.

From 1 mile E.N.E. of Round Backed hill, the coast takes a N. by W. direction $5\frac{3}{4}$ miles to Entrance point, the north extreme of Wilson promontory. Two intermediate points project from the coast, one at $3\frac{1}{2}$, and the other at $2\frac{1}{2}$ miles from Entrance point; these points form the eastern terminations of a range of hills, the highest being mount Hunter, which bears from Rabbit isle N.W. $\frac{3}{4}$ N., distant 6 miles, and rises to the height of 1,148 feet.

The coast is fronted by an extensive shoal bank, the south extremity of which, at one mile N. by W. of Rabbit isle, forms a spit, having between it and the watering place, a bight with $4\frac{1}{2}$ to 4 fathoms water in it. From this spit the 3 fathoms edge of the bank extends N. by W. 2 miles, and N.E. by E. $2\frac{1}{4}$ miles, to its east spit, which forms the south side of the channel over the bar of Corner inlet, with Rabbit isle bearing S. by W. $\frac{1}{2}$ W. and Mount Hunter W. $\frac{3}{4}$ N.

After turning 1 mile W.S.W. from the east spit of the bank, its 3-fathoms edge trends N.W. $\frac{1}{2}$ W., $4\frac{1}{2}$ miles to Entrance point. Between 2 and 3 miles N.N.E. of Rabbit isle is a 3-fathoms bank, with 4 and $4\frac{1}{2}$ fathoms between it and the south spit.

SEAL or DIRECTION ISLES—To the eastward of Rabbit isle is a group of four small islands and rocks, named by Captain Stokes, Direction isles from their usefulness as leading marks for Corner inlet. Clifty isle, the south-easternmost, which lies nearly N.E. $12\frac{1}{2}$ miles from cape Wellington, is about 2 cables' lengths in extent. Rag isle, W. by S. $\frac{1}{2}$ S. $1\frac{1}{4}$ miles from Clifty isle, is 2 cables long, with some rocks close to it and a reef extending about one quarter of a mile from its south-west end. Notch isle, which is a little larger than Clifty isle, lies N.N.W. three-quarters of a mile from Rag isle. Seal isle, the largest of the group, lies N.W. nearly $1\frac{1}{4}$ miles from Notch isle; it is above a mile in circuit, and rises gradually to the height of 380 feet. There was neither tree nor shrub on the island; but the surface was mostly covered with tufts of coarse grass, among which were numerous seal-paths and burrows of the sea-petrels. White rock, the north-westernmost of the group, lies N.W. $\frac{1}{4}$ N. nearly $1\frac{1}{3}$ miles from Seal isle, with which it appears to be connected by a rocky shoal.

CORNER INLET has a channel nearly one mile wide, between Entrance point, the north extreme of Wilson promontory, and Latrobe island, to the north-eastward of it, and forms the entrance to Corner basin, an extensive, but shallow sheet of water between the promontory and the mainland to the northward of it. The inlet is fronted by a bar, the 5-fathoms edge of which, from Rabbit isle, extends N.E. 3 miles, and from thence 6 miles in a N. by E. $\frac{1}{2}$ E. direction towards the east point of Latrobe island. From Townsend point, the south extreme of Latrobe island—which lies E. $\frac{1}{2}$ N. $3\frac{1}{2}$ miles from Entrance point—the shoalest part of the bar, with 9 to 18 feet water on it, sweeps round south-eastward and south-westward 4 miles to within two-thirds of a mile of the east spit of the western bank, with 4 and 5 fathoms between them; the outer part being $6\frac{1}{2}$ miles distant from Entrance point.*

* The description of Corner and Shallow inlets is chiefly derived from the Chart of Corner inlet; but as it was published more than 20 years ago, it is probable that the shoals and bars may have since undergone great changes.

Within the bar, at S.E. by E. $\frac{1}{2}$ E. 5 miles from Entrance point, there are 5 fathoms water, from whence the depth increases to 18 and 19 fathoms up to within half a mile of the point. From a mile within the bar to about the same distance from Entrance point the channel is above a mile wide, with 7 to 16 fathoms water, the northern edge, according to the Admiralty chart, being marked by two buoys; two other buoys appear to mark the northern edge of a bank on the southern side of the channel near Entrance point, and a similar bank lies near the shore, between Townsend point and the south-west entrance of Latrobe island.

These buoys are probably superseded by those more recently moored, to mark the fairway across the bar, and the channel within it; but they are not here described, as their positions do not coincide with the Admiralty chart published in 1842, with additions to 1861. This discrepancy may be accounted for from the fact that Corner Inlet bar, and that of Shallow inlet, to the north-eastward, are both constantly shifting, owing to the action of the sea, tides, and freshes. The buoys which mark the fairway over the bar, are also liable to be washed away.

PILOTS are always on the look-out, and will come off at any time; the commander of a vessel is therefore strongly recommended to avail himself of the services of one, before attempting either the bar of Corner inlet or that of Shallow inlet.

DIRECTIONS.—A vessel of not more than 16 feet draught, may cross the bar of Corner inlet at low water; but should circumstances render it necessary to enter without a pilot, and the bar be as shown on the Admiralty chart, a vessel from the southward, should keep the outer extreme of cape Wellington bearing S. by W., until Cliffy isle is brought its breadth open to the eastward of Seal isle, bearing nearly S.E. by E., when the latter objects kept in position will be the leading mark up to the inlet. Having passed Entrance point, Corner basin suddenly opens to view, when the vessel may proceed according to her destination.

TIDES.—It is high water in Corner inlet, full and change, at 11h. 40m.; springs rise 8 feet.

CORNER BASIN extends 4 miles North and South, and 14 miles from Entrance point to the north-west corner of the basin, into which flows Tarwin rivulet. The northern and south-eastern shores are fronted by swampy mangrove islands and the basin is mostly filled by mud-banks. Captain Stokes formerly described Corner basin as a great useless sheet of water, from its being only navigable for a few miles within its entrance, and that chiefly in the northern part, the remaining portion being occupied by mud-flats, with intricate channels.

From Entrance point the coast trends $1\frac{1}{2}$ miles westward to the north-west point of Wilson promontory, at half a mile within which a hill rises

to the height of 502 feet : the shore may be approached within half a mile, in 5 and 6 fathoms.

Between the north coast of Wilson promontory and the 3-fathoms edge of the shoal banks to the northward of it, the inlet is 1 to $1\frac{1}{4}$ miles wide, with 5 to more than 21 fathoms water. A narrow bank, with $2\frac{1}{2}$ to $4\frac{3}{4}$ fathoms on it, forming a sort of inner bar partly across the entrances of the three largest of the channels, into which the inlet branches, extends from one-third of a mile northward to $1\frac{1}{3}$ miles N.W. $\frac{1}{2}$ W. from the north-west point of Wilson promontory.

ANCHORAGE.—A vessel may anchor in 8 fathoms, at about one-third of a mile from the shore, with Entrance point bearing E.S.E., and the hill within the north-west point S. by W. $\frac{1}{4}$ W.

From the north-west point of Wilson promontory the eastern shore of Corner basin extends 5 miles to the southward, and then 6 miles south-westward to the south bight of the basin. For the first two miles the coast consists of small shoal bights, with rocky points, which may be approached to a quarter of a mile, in 11 to 5 fathoms ; but from a small creek 2 miles W.N.W. of mount Hunter, the coast is fronted by an extensive flat, the edge of which trends from the creek in a south-west direction. Benison islet, which has a small rock close to the southward of it, is situated near the edge of the flat, S.W. by W. $\frac{3}{4}$ W. $3\frac{3}{4}$ miles from mount Hunter. A low wooded island, about half a mile in extent, lies in the bight formed in the coast to the south-westward of mount Hunter.

BENISON CHANNEL, from its entrance on the west side of the north-west point of Wilson promontory, trends along the shore and into the flat to the south-westward ; it is half a mile to a quarter of a mile wide, with irregular soundings in 9 and 3 fathoms, to within $1\frac{1}{4}$ miles of the south-west shore, the deepest water being at half a mile North of the creek. There is a 2-fathoms knoll close within the entrance, and at three-quarters of a mile North of Benison islet a narrow loop runs about a mile into the northern bank of the Channel.

MIDDLE CHANNEL, from its entrance, at half a mile westward of the north-west point of Wilson promontory, trends south-westward 8 miles into the bank, and for about 6 miles in, is 4 cables wide, with 9 to 5 fathoms water, and 2 fathoms within a mile of the south-west shore. On the bank which separates this from Benison channel, is Granite islet, a mere rock, bearing W. by N., distant $2\frac{3}{4}$ miles from mount Hunter.

FRANKLYN CHANNEL is separated from Middle channel by a bank, the eastern end of which forms a spit at N.W. by W. three-quarters of a mile from the north-west point of Wilson promontory. The entrance of Franklyn channel lies between this spit and the eastern end of a long

narrow bank, which from 1 mile N.N.W. of the spit extends W. by S. 3 miles, and for that distance, forms the north side of the channel, which is three-quarters of a mile wide, with 6 to 10 fathoms water on its north side, for about 2 miles within the entrance, when a projection of the south bank with 6 feet water on it, contracts the channel to half that width ; but there is a depth of 12 fathoms in this narrow part.

From the west end of the long narrow bank, Franklyn channel trends W.N.W. 2 miles, with 13 to 5 fathoms, when it divides into three branches running into the bank to the westward, the northernmost, up to the Saw mills, at N.W. by W. $\frac{1}{2}$ W., 12 miles from Entrance point ; the middle branch carries 9 to 2 fathoms up to $1\frac{1}{4}$ miles, and the southernmost, 5 to 2 fathoms to within a mile of the shore. Between the east end of the long narrow bank and the mud-flat, at one-third of a mile North of it, is the entrance to a channel trending West $1\frac{1}{2}$ miles, and then running into the bank towards the north corner of the basin, with 13 to $4\frac{1}{2}$ and 9 to 7 fathoms, for about 4 miles. A spit projects from the south side of the channel, at $1\frac{1}{2}$ miles within its entrance.

The southernmost part of the north shore of Corner inlet is a low point bearing N.N.W. $\frac{1}{2}$ W., distant $3\frac{3}{4}$ miles from the north-west point of Wilson promontory, and has two low islets near it, one at a quarter of a mile eastward, and the other one mile north-eastward of it. From the west side of this point the coast trends westward and northward ; and from the east side the low mangrove shore curves N.E. $\frac{1}{4}$ E. $2\frac{1}{2}$ miles, and E. by N. $3\frac{1}{4}$ miles, from whence it extends 6 miles in a N.E. by E. $\frac{1}{2}$ E. direction to the entrance of Port Albert. This coast is intersected by numerous creeks, between the first two of which is the township of Welchpool, at N. by W. 5 miles from Entrance point.

From 2 miles S.S.W. of Welchpool a swampy mangrove island extends E.N.E. $\frac{1}{2}$ miles, and is one mile to a quarter of a mile broad : it is separated from the main-land to the northward, by a mud-flat three-quarters of a mile wide, through which Lewis channel trends to the eastward.

LEWIS CHANNEL is the northernmost, and although the smallest, it appears to be the most important of the channels which branch from Corner inlet. The entrance of this channel is a narrow opening between the mud-flats, with only 2 and 3 fathoms water in it, bearing N. by W., distant $1\frac{2}{3}$ miles from the north-west point of Wilson promontory. Close within the entrance the channel is only $1\frac{1}{2}$ cables wide, with 3 fathoms water, from whence it curves through the mud-flats in a N.W., North, and N.E. direction 4 miles to Welchpool, passing close to the eastward of the two low islets just noticed. From the width of 2 cables and the depth of 5 fathoms at one mile within the entrance, the channel decreases to one cable wide, with $1\frac{1}{2}$ fathoms water abreast of Welchpool, from whence it

trends eastward between the mangrove islands and mud-flats, to the western channel from Shallow inlet to Port Albert.

LATROBE ISLAND, which lies between Corner and Shallow inlets, from 3 miles N. by W. of the north-west point of Wilson promontory, extends East 9 miles to the west side of Shallow inlet; it is low, and is 3 miles across from its north point to Townsend point. The north side of the island for the first $2\frac{1}{4}$ miles, is connected with the swampy mangrove island to the north-westward, by the mud-flat which surrounds it; and from thence to the east point of Latrobe island, its north side is intersected by shallow bights, mostly filled with mangrove swamps; the largest bight trends $3\frac{1}{4}$ miles south-westward into the island, reaching within one-third of a mile of its opposite shore. This bight is $1\frac{1}{4}$ miles wide at its entrance and for about 2 miles within it.

The southern shores of Latrobe island are regular, trending from its west point S.E. 3 miles; then E. $\frac{3}{4}$ S. $2\frac{1}{2}$ miles to Townsend point, and from thence N.E. $\frac{3}{4}$ E. $5\frac{1}{2}$ miles to the east point of the island, on which is a light-house.

PORT ALBERT LIGHT-HOUSE, on the east point of Latrobe island, is a wooden building, painted *white*, exhibiting at 40 feet above the mean level of the sea, a *red* fixed and flashing light, visible from a vessel's deck, at the distance of 9 miles, between the bearings of N.E. and W. by S. It flashes every 3 minutes; but when within 3 miles of the light, the eclipses will be scarcely observable, a continued fixed light being at that distance visible between the intervals of the bright flashes.

A LIFE-BOAT is stationed at the light-house.

SHALLOW INLET, which forms the entrance of Port Albert, is barely three-quarters of a mile wide between the east point of Latrobe island and the south-west point of a range of small low islands and banks, which form the coast from thence north-eastward for a distance of 5 miles. From these entrance points, shoal banks extend about two miles to the south-eastward, between which the fairway channel trends N.W. $\frac{3}{4}$ N. nearly $1\frac{2}{3}$ miles from the bar, across the entrance of this channel, to the narrows, which are close to the eastern inner entrance point.

The outer entrance of the channel between these banks is a quarter of a mile wide, and has a bar with 15 feet water on it, from which Port Albert light-house bears N.W. $\frac{3}{4}$ W., distant two miles. Within the bar the channel increases to two-thirds of a mile in width, until it again contracts towards the narrows, with the depth of water increasing from $2\frac{1}{2}$ fathoms on the bar, to 9 fathoms close to the eastern inner entrance point. There are 7 to 3 and 4 fathoms across the inner entrance from the narrows to the light-house.

The bar and channels within it, and the positions of the buoys, as given by the local authorities, are so much at variance with the Admiralty chart, that they can be noticed in no other way than that in entering from the sea the *red* buoys, with even numbers, are to be kept on the starboard, and the *black* buoys, with the odd numbers, on the port hand.

Within the entrance near the light-house, the inlet is divided into two channels, the wider and deeper one sweeping round westward, northward, and north-eastward 7 miles, and the other northward and westward 5 miles, when they rejoin each other at N.N.W. 4 miles from the light-house. The space enclosed by these channels is mostly occupied by an island 4 miles long, E.N.E. and W.S.W., and about $1\frac{1}{2}$ miles broad, having tea trees and stunted bushes on it. It is surrounded by shallow flats, on which are some smaller islands and mangrove swamps.

THE WESTERN CHANNEL from its entrance, North of the light-house, extends West $3\frac{1}{2}$ miles, when it divides into two branches, one continuing West, between the low islets and flats, towards Lewis channel, and the other trending to the northward. From the width of two-thirds of a mile at its entrance, the channel increases to more than three-quarters of a mile at nearly 2 miles within it, and then decreases to little more than one-third of a mile where the western branch turns towards Lewis channel. The wide part of the channel has large shoals, extending 3 miles up from the entrance, leaving a passage 3 to $1\frac{1}{2}$ cables wide with 9 to 3 fathoms on the south side, and another about 1 to 2 cables wide, with 2 to 4 fathoms, on the north side of the shoals. The western branch has 7 to 2 fathoms, for a distance of 1 mile, and the northern channel, which is 2 cables wide, has depths of 7 to 3 and 5 fathoms for about $1\frac{3}{4}$ miles up, and from thence only 6 feet to its junction with the Eastern channel.

THE EASTERN CHANNEL, from its entrance, at 1 mile north-eastward of the light-house, is 1 to 3 cables wide, with 2 to 5 fathoms water, for about $1\frac{1}{2}$ miles to the northward, where a narrow creek branches off 6 miles to the northward and eastward. At $1\frac{1}{4}$ miles to the northward of this, another creek branches off in a N.E. direction, towards the mouth of Tarra-tarra river, at 2 miles above which in a direct line, is Tarraville. These creeks lie between shallow flats and small islands.

PORT ALBERT.—ALBERTON.—At N.N.W. $3\frac{1}{2}$ miles from the light-house, the western and eastern channels unite in one creek, which trends through the shoal flats N.E. by N. 1 mile to the entrance of Port Albert, which is a shoal inlet three-quarters of a mile wide, running in $1\frac{1}{2}$ miles northward to the mouth of Albert river, at 1 mile above which, in a direct line, is Alberton, the capital of Gippsland. There is also a settlement on the east shore of the port.

PILOTS.—As the bar of Shallow inlet, like that of Corner inlet, is constantly shifting ; the master of a vessel is strongly recommended to take a pilot before attempting to enter Shallow inlet ; more especially as the buoys, which mark the fairway channel, are liable to drift away, when a stranger would find great difficulty in getting into the right channel.

TIDAL SIGNALS for PORT ALBERT.

One black ball	-	-	-	-	8 feet.
One red flag	-	-	-	-	9 „
One white flag	-	-	-	-	10 „
One ball, with white flag over			-	-	11 „
Two balls	-	-	-	-	12 „
Two balls, with white flag under			-	-	13 „

DIRECTIONS.—A vessel from the westward, bound to Shallow inlet, should, after rounding Wilson promontory and passing cape Wellington, keep Rodondo isle, a small, but high island, 6 miles to the southward of the promontory, just open of that cape, bearing S. by W. $\frac{1}{2}$ W., which will lead up to the bar. This course may be continued until mount Hunter bears W. by S. $\frac{1}{2}$ S. ; but not beyond that bearing until, by hauling more to the eastward, the light-house on the east end of Latrobe island is brought to bear N.W. $\frac{3}{4}$ W., when, if the bar is as shown on the Admiralty chart, steer for it on that bearing until the outer *red* buoy be seen, which, with the other *red* buoys, must be kept on the starboard, and the *black* buoys on the port hand.

From the eastward.—A vessel approaching Shallow inlet from the eastward, should proceed along shore at the distance of 3 or 4 miles, until the light-house on Latrobe island bears N.W. $\frac{3}{4}$ W., when steer for it on that bearing, and having distinguished the outer *red* buoy, enter the inlet as directed when proceeding from the westward.

Vessels bound to Port Albert generally enter by Shallow inlet ; but as the water breaks across the entrance, it was formerly considered more prudent to enter by Corner inlet, and from thence proceed through Lewis channel.

At night.—As the land is very low in the vicinity of Shallow inlet, vessels should approach the bar at night, with great caution ; for the light being only 40 feet above the mean sea-level, it may sometimes not be seen before the vessel is close in with the sand-banks, and if a pilot be not obtained before dark, it will be advisable to stop well short of danger.

TIDES.—It is high water on Shallow inlet bar, full and change, at 11h. 40m. ; springs rise 8 feet. The tides are here much influenced by the winds ; during westerly gales the stream runs with considerable velocity ; the flood to the westward, and the ebb East.

THE LONG NORTHERN BEACH forms a curve extending in an N.E. by E. direction 135 miles from Shallow inlet to cape Everard, with only very slight interruptions to its uniformity. From 12 miles north-eastward of Shallow inlet to Snowy river, 32 miles westward of cape Everard, the beach is nearly separated from the low land behind it by lakes and lagoons, the most extensive of which is lake Victoria, at about mid-way between Shallow inlet and the cape. This lake communicates with the sea by a small entrance at 27 miles westward of Snowy river; and at $3\frac{1}{2}$ miles to the eastward of this entrance is that of lake Tyers. Between Snowy river and cape Everard there are several small lagoons and inlets; and cape Conran, 5 miles to the eastward of the river, has a small islet, or rock, close to the south-eastward of it. At 6 miles eastward of cape Conran is Pearl point, with two small openings between them; that at 2 miles to the westward of the point being Dock inlet. Sydenham inlet lies 14 miles, and Tamboon river 7 miles, to the westward of cape Everard.

CAPE EVERARD is a peninsular projection, having three points, and extending nearly $1\frac{1}{2}$ miles from the line of coast. Another point at 1 mile north-eastward of the cape, forms the south-west side of a bay $1\frac{1}{2}$ miles in extent, at the head of which is said to be Toolaway river. The cape and this point have rocks close about them.

RAM HEAD.—From the north-east point of the bay, just noticed, a broken and irregular coast extends about E.N.E. nearly $7\frac{1}{2}$ miles to Ridge-end point, which is bordered by a reef; from thence a sandy shore with a few rocky heads, trends N.E. by E. $\frac{1}{4}$ E. $7\frac{1}{2}$ miles to Ram head; the head is fringed by a reef on which are peaked rocks, in lat. $37^{\circ} 42' 30''$ S., long. $149^{\circ} 38' 15''$ E.*

From Ram head, the coast extends N.N.E. $9\frac{1}{2}$ miles to Mallagoota point, at N. by E. 1 mile from which is the narrow and shallow bar entrance of an inlet $2\frac{1}{2}$ miles wide, extending N. by E. 4 miles. There are four islets close within the entrance, and from $2\frac{1}{2}$ miles N.W. of it an arm branches north-westward to the mouth of Genoa river. From the entrance of this inlet the coast trends E. by N. $\frac{1}{2}$ N. $6\frac{1}{2}$ miles to a point, close off which is Gabo isle, and from thence N.E. $\frac{1}{2}$ N. 4 miles to Cape Howe.

GABO ISLE, which is 1 mile long, N.N.W. and S.S.E, is of rocky formation, but is partly covered with loose sand, rising to the height of 157 feet. There is a small cove on the north-west side of the island, where H.M.S. *Bramble* worked in and anchored, finding perfect shelter from the eastward.

LIGHT.—Gabo light-house is a circular *grey* granite tower, with its light-room and top of lantern painted *white*, situated at 1 cable's length from the south-east extreme of the island, and shows a fixed *white* light at

* See Chart of Australia, East Coast, No. 2,141; scale $m = 0.26$ of an inch.

172 feet above the level of the sea, visible in clear weather, at the distance of 17 miles, between the bearings of E. $\frac{1}{2}$ N. round by North to S.S.W.

ASPECT.—The land for some miles behind the coast from Shallow inlet to Cape Howe, is low, sandy, and partly covered with small trees, at the back of which rise some elevated ranges of mountains that are visible in clear weather, at the distance of 60, and perhaps 90 miles. These mountains approach the high land of cape Liptrap and Wilson promontory within 18 miles; after which, they retire several miles farther from the coast, and again approach it towards Ram head and Cape Howe. In clear weather, this high land is visible long before the low sandy coast, though no part of it appears to be sufficiently remarkable to be considered a conspicuous object. The hills most worthy of notice within 40 miles of Cape Howe, are apparently, West hill at N.W. 6 miles from cape Everard and Coast hill, N. W. $\frac{1}{2}$ W. 7 miles from Ram head. The soundings deepen rapidly toward Ram head and Cape Howe, both of which are bold, and clear of dangers.

SOUNDINGS. — From Hogan group, 29 miles eastward of Wilson promontory, to 53 fathoms at 7 miles southward of Gabo island, there are 28 to 42 fathoms for the first 60 miles, and then no bottom at 59 and 53 fathoms, until within 10 miles of Gabo isle, where there are 45 fathoms. Between this line of soundings and the Long Northern beach the space appears not to have been sounded, except that from 25 and 35 miles north-eastward of Hogan group the depth gradually decreases, towards the land, to 10 fathoms at N.E. by E. $\frac{1}{2}$ E. 30 miles from Shallow inlet, where that depth is 15 miles off shore.

EASTERN ENTRANCE OF BASS STRAIT.

The eastern entrance of Bass strait is the space included between Wilson promontory and the north-east point of Tasmania. Between these two headlands are numerous islands, occupying an extent of about 120 miles, which, from their primitive formation of hard granite, and the peculiar manner in which they lie, as a connecting chain, would appear to have been the upper part of a range of hills which once joined the two lands, before a combination of natural causes effected their disunion, and produced the opening which now bears the name of Bass strait.

That such was the original formation of this part, or at least its disposition a comparatively few ages ago, appears extremely probable on inspecting the chart; as also that Wilson promontory and cape Liptrap were formerly insulated, but have since been rejoined to the high mountains behind them, by the south-east gales of winter throwing up the sand and loose earth, such as now form the Long Northern beach. These points, however, can have little effect upon the present navigation of the coast,

which is the object exclusively under consideration ; and they are merely alluded to thus slightly, for the purpose of drawing the attention of those navigators and scientific men, who may possess inclination and opportunity to elucidate a subject so interesting to geography and science.

RODONDO ISLE, S. by E. 6 miles from the south point of Wilson promontory, is a conspicuous conical lump of granite, rising to the height of 1130 feet above the sea, and visible in clear weather, at the distance of 30 miles from a ship's deck. Its upper part is thickly clothed with vegetation ; but it is so steep that even seals find no resting place on its declivities. A small rock, 10 feet high, with a breaker on its east side, lies N.N.E. $\frac{3}{4}$ E. 2 miles from the summit of Rodondo, with apparently a clear channel between them ; but on account of the rapidity of the tide streams, which sometimes run here at the rate of 4 and 5 knots, its neighbourhood should be avoided during light winds : the flood stream comes from the eastward.

MONCEUR ISLES, which lie E. $\frac{3}{4}$ N. between 5 and 7 miles from Rodondo isle, are three almost bare rocks, which appear bold and free from dangers, but vessels seldom approach them in passing, as preference is given to the channel farther to the southward, between Curtis isle and Kent group.

CURTIS ISLE, S.E. $\frac{1}{2}$ E. $18\frac{1}{2}$ miles from Rodondo isle, is 2 miles long, N.E. and S.W., and 1 mile broad, with a square summit on its southern part 1,060 feet high ; but towards the North it slopes away something in the shape of a shoe, from which it is called by the sealers the "Slipper," and may be seen in clear weather, at the distance of 33 miles from a ship's deck. The central position of this island renders it quite a finger-post for vessels passing through the strait.

The **SUGAR LOAF ROCKS** are two in number ; one, which is 350 feet high, bears S.E. $\frac{1}{4}$ E., distant $1\frac{1}{2}$ miles ; and the other, 316 feet high, S.S.E. $2\frac{1}{2}$ miles from the summit of Curtis isle. There is deep water close to them, except off the south side of the northern Sugarloaf, where there is said to be a small rock, at the distance of a quarter of a mile.

CLARENDON ROCK, discovered in 1857, lies E. by N. $\frac{1}{2}$ N. 2 miles from the summit of Curtis isle, and has 9 feet water on it.

Mr. G. N. Levesay, master of the *Pyramus* in 1839, reports having seen a rock awash at about a mile to the northward of Clarendon rock ; but, according to the opinion of Captain P. P. King, R.N., in 1853, this report wanted confirmation.

No other dangers are known to exist about these islands, and they have been frequently approached close to by many passing vessels.

CROCODILE ROCK is dangerously situated in line midway between Rodondo and Curtis isles, being distant 9 miles from each island. Captain Hobson, who passed within a mile of it in H.M.S. *Rattlesnake*, in 1837, states, that for a space probably of 50 yards, the rock is elevated about 3 or 4 feet above the level of the sea at high water, and appears to have a reef extending three-quarters of a mile to the N.W. Captain Stokes describes it as a smooth round-topped granite boulder, just protruding above the surface of the water, and that in fine weather, the sea runs over it without breaking.

A ROCK AWASH has been reported to lie E.N.E. $7\frac{1}{2}$ miles from Crocodile rock, and N. $\frac{1}{2}$ W. 8 miles from Curtis isle.

DEVILS TOWER, N.N.E. $\frac{3}{4}$ E. 8 miles from the summit of Curtis isle, is a small but conspicuous lump of bare granite 350 feet high, and is fringed by a reef; it is frequented only by seals and birds, and their pursuers, and appears to have no dangers in its immediate vicinity.

HOGAN GROUP is a cluster of small rocky islands lying close together, the largest of which lies N.E. $\frac{1}{4}$ N. 15 miles from Devils tower; this island, which is also the most elevated of the group, is $1\frac{1}{2}$ miles long, North and South, and 430 feet high. One of the smallest of the group lies close to the south-east point, and two dry rocks lie near the north point of the largest island, with which all appear to be connected by reefs. Two other islets of the group front a boat-cove on the north-east side of the largest island; and at about 2 miles north-eastward of the north point of the island are two rocks, the outer one just awash.

Water.—There is fresh water in the boat-cove, and the upper parts of Hogan group produce some little vegetation.

SOUNDINGS.—There are soundings in 40 to 29 fathoms from Curtis isle to Hogan group, and between them and Wilson promontory there are similar depths of water, the bottom being generally sand, shells and coral.

DIRECTIONS.—No other covered dangers are known to exist between Curtis isle and Wilson promontory; but in the night, or during thick weather, it will be prudent for a stranger, who is desirous of clearing the strait, to obtain a sight of Curtis isle, and pass on its south side, as its high summit and the two Sugarloaf rocks to the southward of it, are remarkable objects, by which its identity cannot be mistaken.

KENT GROUP, S.E. by E. 18 to 24 miles from Hogan group, consists of Deal and Erith islands, divided by Murray pass, and of N.E. isle, which lies E.N.E. $1\frac{3}{4}$ miles from Garden point, the north extreme of Deal island. Deal island, the south-easternmost and largest of the group, is $3\frac{1}{2}$ miles long, North and South, and $2\frac{1}{2}$ miles broad it rises to conical

granite hills, some of which are clothed to their summits with an impenetrable scrub. The highest of these hills, on which is the light-house, rises from the south point of the island to the height of 883 feet.

Deal island has four sandy coves where vessels may anchor. Garden cove, in which is fresh water, is at the north end; Squally cove is on the east side of the south point; Winter cove is on the east side, and East cove is on the west side of the island. H.M. *Beagle* was detained a fortnight in East cove by easterly gales; but it was found a confined anchorage, although H.M.S. *Bramble* had sufficient room, and experienced no difficulty in getting in or out.

LIGHT.—The light-house on Deal island, which is situated in lat. $39^{\circ} 29' 45''$ S., long. $147^{\circ} 21'$ E., and E. $\frac{3}{4}$ N. 32 miles from Curtis isle, is a circular stone tower 67 feet high, with its upper part *red* and lower *white*, exhibiting, at the height of 950 feet, a light which revolves every minute and 40 seconds; at the distance of 10 miles it is 50 seconds bright and 50 seconds dark. The light is visible at the distance of 36 miles; but from its great elevation, it is sometimes obscured by fogs.*

MURRAY PASS, the channel which separates Deal from Erith island, is nearly half a mile wide, with soundings in 29 to 33 fathoms in mid-channel.

ERITH ISLAND, the western of the two principal islands of Kent group, is $3\frac{1}{4}$ miles long, N.N.E. $\frac{1}{2}$ E., and S.S.W. $\frac{1}{2}$ W., and is about $1\frac{1}{4}$ miles across, at its broadest part. At 1 mile from Foreness, the north point of the island, it is nearly divided into two by the Funnel, a narrow isthmus, awash at high water. This, like Deal island, rises to hills, one of which, near its northern end, is 535 feet high. The west side of Erith island forms an exposed bay, in the entrance of which, at about three-quarters of a mile northward of West bluff, the south-west point of the island, is the doubtful position of a sunken danger. On the east side of the north point of this bay is Wallabi cove, at about half a mile off the entrance of which is a patch of rocks above water, W. by N. $\frac{1}{2}$ N. half a mile from Foreness, the north point of Erith island.

West cove is an anchorage in 8 and 7 fathoms on the east side of Erith island, at about half a mile to the northward of the Funnel. It affords shelter from westerly winds, but it is subject to violent gusts, which do not

* While Lieutenant C. B. Yule was inspecting some of the light-houses in Bass strait, in 1846, he noticed one night, the light on Deal island was invisible from the *Bramble*, at anchor in East cove, which, on his ascending to the light-house, he found was owing to the clouds which enveloped it, the lower parts of the island being at the same time free from fog. It will thus appear that, where the locality in these latitudes will admit of the choice of site, a light-house should not be erected at a greater elevation above the level of the sea than necessary for the light to be distinguished.

reach East cove. Vessels lying here should have a cable to the shore, as the prevailing winds blow in strong gusts over the high land.

N.B. Isle is about $1\frac{1}{2}$ miles in circumference ; it rises to a hill in the centre, and has some rocks close about it.

Kent group appears free from any other detached dangers than those already noticed ; and the rocks about the numerous points of the island do not appear to project very far.

Water.—Fresh water is abundant in the northern part of Deal island, and there are many parts of the island capable of cultivation.

TIDES.—It is high water at Kent group, full and change, at 11h. 10m. ; springs rise 8 feet ; the stream in Murray pass, which runs from 2 to 5 knots, changes to the northward 20 minutes after high water.

The channel between Hogan and Kent groups is 17 miles wide, with soundings in 29 to 35 fathoms.

JUDGMENT ROCKS, so named from the resemblance of one of them to an elevated seat, lie W. by S. $\frac{3}{4}$ S. and W. by S. 9 miles from the light-house on Deal isle, and consist of a steep island two-thirds of a mile long, with two smaller islets and rocks to the northward of it.

THE PYRAMID, South 20 miles from Deal Island light-house, is a small elevated flat-topped rock 300 feet high, through which there is a chasm. A sunken reef extends nearly half a mile from its south side ; but it is otherwise safe to approach, having 38 to 40 fathoms water between 4 and 5 miles to the N.W. and S.W., and 26 fathoms at 8 miles to the eastward, on a bottom of sand and shells.

WRIGHT ROCK, E. by S. $\frac{3}{4}$ S. $11\frac{1}{2}$ miles from Deal Island light-house, is small ; but being 200 feet above the level of the sea, it is a conspicuous object. Captain Flinders passed at night, near enough to the south side of this rock to hear the seals on it, and had 30 fathoms on a coarse bottom ; but this passage is rocky and unsafe.

The channel between Kent group and Wright rock, which is 10 miles wide, has tolerably regular soundings in 23 to 29 fathoms, sand and shells: there are 29 fathoms, gravel and small stones, at 2 miles to the N.W. of Wright rock, and the same depth, on a coarse sandy bottom, 5 miles to the northward. This depth continues for 30 miles farther in a N. by E. direction, when it gradually increases, and the bottom becomes fine sand.

ENDEAVOUR REEF, which covers, lies in line with Wright rock and Deal Island light-house, distant about $2\frac{1}{2}$ miles from the rock.

EAGLE REEF, East 3 miles from Endeavour reef, and nearly in line with it and Wright rock, is just awash at high water.

CRAGGY ISLE, S.E. by E. $\frac{1}{4}$ E. $8\frac{1}{4}$ miles from Wright rock, is small and clifty, with rocks close to its east and west ends, and a sunken rock at 1 mile E.N.E. of it.

Endeavour and Beagle reefs, and the sunken rock E.N.E. of Craggy isle, which appear to be connected by foul ground, are the chief dangers between Kent group and Flinders island, to the south-eastward, the north-west and south-east extremes of these dangers being marked by Wright rock and Craggy isle, between which vessels should not pass, although, on an emergency, a vessel may go through the narrow channel on the south side of Wright rock.

TIDES.—It must be borne in mind that the tide streams, which here sometimes run 2 knots, set S.W. by S. and N.E. by N., the north-easterly, or ebb stream, beginning at a quarter before noon, at full and change of the moon.

FURNEAUX GROUP, the south-easternmost of the chain of islands between Wilson promontory and the north-east extreme of Tasmania, consists of Flinders and Barren islands, the two largest of the group, and numerous smaller islands, rocks, and shoals. This group extends from the Sisters S.S.E. nearly 60 miles to Moriarty bank, and 32 miles across.

THE SISTERS are two high islands, one bearing E. by S. $\frac{1}{4}$ S., distant 29 miles, and the other E. $\frac{1}{2}$ S., 32 miles from Deal Island light-house, and are visible in clear weather, at the distance of 30 miles from a ship's deck. The south-western and larger island is upwards of 3 miles long, East and West, and is nearly surrounded by sunken rocks. The north-eastern island, which is about two-thirds the size of the other, has a detached rock at nearly a mile to the southward of it, and sunken rocks close to all its points, except that to the N.E. The channel between these two islands is $2\frac{1}{2}$ miles wide, with 9 to 20 fathoms water in it. The Sisters have rather uneven surfaces, with not much vegetation, but they harbour numerous sea-birds.

The channel between Craggy isle and the Sisters, which is nearly 7 miles wide, has 24 to 27 fathoms water, and is free from dangers; but a reef extends from the south-western Sister to the north extreme of Flinders island.

FLINDERS ISLAND, the largest of the Furneaux group, is 36 miles long, about N.W and S.E., and 20 miles broad at the centre; its north-west point, from which a reef projects a short distance, bears nearly E. by S. $\frac{3}{4}$ S., distant $28\frac{1}{2}$ miles from Deal Island light-house. The principal ridges on the island take a general S.S.E. direction from its north-west point to its south-west extreme, and are barren and mountainous, presenting a bold abrupt front to the westward, and sloping to the low land on the eastern

side, which is bordered by a sandy beach. These ridges are separated at about the middle of the island, by Heathy valley, which stretches across it. The west side of Flinders island is fronted by several small islands, under the lee of which vessels may find shelter from westerly winds.

CAPE FRANKLAND, S.S.W. 9 miles from the north-west point, is the western and central extremity of a hilly peninsula extending 5 miles N. by W. and S. by E., and 4 miles from the western coast-line of Flinders island, and has a bight to the North and South of it. Mount Killicrankie rises from the north-west part of this island to the height of 1,000 feet.

A reef projects a short distance from the cape, and two islets with some rocks lie between $1\frac{1}{2}$ and $2\frac{1}{2}$ miles N. by E. of it. Pasco islets, which are four in number, and mostly connected by reefs, extend from the shore at 2 miles south-eastward of the cape, 4 miles in a South direction. A reef projects a short distance from the south point of the peninsula; and in the bight to the eastward of it, is the cluster of Flat rocks, between which and the shore to the northward, there is a Boat-harbour, with 3 fathoms water in it.

FRANKLAND ROCK, W. $\frac{3}{4}$ S. $4\frac{1}{2}$ miles from cape Frankland, is a double rock awash at half tide, with 18 to 23 fathoms close about it.

Between the south point of the peninsula of cape Frankland and Settlement point, S.E. by S. 6 miles from it, the west coast of Flinders island forms a bay $3\frac{1}{2}$ miles deep, with 8 to 10 fathoms across its entrance, and 9 to 4 fathoms along its southern shore; but it is exposed to the westward.

SETTLEMENT POINT is a hilly projection, having a small reef on its south side, and a cluster of islets and rocks extending a quarter of a mile to $1\frac{1}{4}$ miles south-westward from it, with 6 fathoms between the islets and the point.

HUMMOCK ISLE, the north point of which lies W. by S. $3\frac{3}{4}$ miles from Settlement point, is $5\frac{1}{2}$ miles long, N. by E. and S. by W., and is 1 mile broad at either end, between which it is only half a mile across. Its two highest hills are on its northern and southern ends, the former being 513 and the latter 400 feet high. From the north point a reef stretches three-quarters of a mile to the northward, a continuation of which borders the eastern side of the island and trends southward to a small islet close to the shore, at two miles from the south point. The 5 fathoms edge of this reef extends about one-third of a mile from the shore.

ANCHORAGE.—There is good anchorage in 6 fathoms, on the east side of Hummock island, at about three-quarters of a mile to the northward of the small islet, just noticed, and half a mile from the shore. It may be

approached by passing round either the north or south end of the island. H.M.S. *Elk* here rode out one of those violent shifting gales, or revolving storms, to which these localities are subject.

LOW ISLETS are three in number, lying between S.E. by S. three-quarters of a mile and South 2 miles from the south point of Hummock island: they lie in line, N.N.E. $\frac{1}{2}$ E. and S.S.W. $\frac{1}{2}$ W.; the southernmost and largest islet being half a mile in extent. The reef on which these islets are situated, extends nearly half a mile northward, from the northeasternmost islet, between which and the south point of Hummock island is a safe passage nearly half a mile wide.

The west coast of Flinders island, from Settlement point, curves E. by S. $\frac{1}{2}$ S. 2 miles to a projection, between which and Long point, S.E. $4\frac{1}{2}$ miles from it, is a bay $1\frac{1}{2}$ miles deep, with mountainous land behind it; the highest summit being the Sugar-loaf, which bears East, distant $6\frac{1}{2}$ miles, from Settlement point, and is 1,410 feet high.

LONG POINT, which has a rock awash close off it, is a peninsula stretching about $1\frac{1}{2}$ miles southward from the line of coast, from which it is nearly separated by a shallow inlet having a narrow entrance, with a small islet close to its eastern point, and another on the west side of the inlet. Between Long point and another projection, $2\frac{1}{4}$ miles to the eastward of it, the bight is full of shoal patches, which appear to prevent a near approach to the fresh water near the shore, at three-quarters of a mile to the northward of the eastern point of the bight.

From the east point of the bight, just noticed, the west coast of Flinders island takes a S.S.E. direction $6\frac{1}{2}$ miles to the north point of a hilly projection, extending $1\frac{1}{4}$ miles N. by W. $\frac{1}{2}$ W. and S. by E. $\frac{1}{2}$ E., and 1 mile from the line of coast. At E.N.E. 2 miles from the point Strzelecki peaks, the highest mountains on the island, rise to the height of 2,550 feet. Between 2 and 3 miles northward of the point is a slight projection of the coast, close behind which is a fresh-water swamp.

The south-west point of Flinders island lies S.E. by S. $1\frac{1}{4}$ miles from the south extreme of the hilly projection just described, and has a small bight on either side of it.

REEF ISLES are four in number, with several rocks above water, connected by reefs extending from 3 miles westward to $4\frac{3}{4}$ miles S. by W. $\frac{1}{2}$ W. from Long point. The northernmost island is nearly 1 mile long, North and South, and is enclosed by rocky shoals, extending farthest from its south point; but the island may be approached on its west side, within a mile in 10 and 11 fathoms water. The other three, which are small islets, lie respectively S.E. by E. 2 miles, S. by E. $\frac{1}{4}$ E. $2\frac{1}{2}$ miles, and S. by E. $\frac{3}{4}$ E. $4\frac{1}{2}$ miles from the northernmost island, and are connected by a narrow continuous reef, extending south-westward from the eastern-

most to the westernmost, and from thence south-eastward to the southernmost islet.

Another small island lies South $1\frac{3}{4}$ miles from Long point, between which and Reef isles there are 4 and 5 fathoms water; the depth decreases northward to $2\frac{1}{2}$ fathoms abreast of Long point. Between this island and the coast to the eastward of it, the space appears to have been very little sounded, only showing 6 to 9 feet water at half a mile and three-quarters of a mile from the shore.

SOUNDINGS.—There is a clear channel nearly 2 miles wide, with 8 to 10 fathoms water, between the northern end of Hummock island and the islets off Settlement point; and another 5 miles wide, between the island and Reef islets; the soundings gradually increasing southward, to 21 fathoms between Low islets and the southernmost Reef islet.

TIDES.—The tide streams in this channel nearly follow the trend of Hummock island, the flood setting to the southward, three-quarters of a knot, and the ebb to the northward, half a knot.

KANGAROO ISLAND, the centre of which lies S. by E. $\frac{1}{2}$ E. 5 miles from the summit of the northernmost Reef isle, is of a crescent form, with its points to the southward and south-eastward, each having a reef projecting a short distance from it. This island is $1\frac{1}{2}$ miles long N.N.E. $\frac{1}{2}$ E. and S.S.W. $\frac{1}{2}$ W., and one-third of a mile broad at the centre. Reefs extend two and three cables' lengths from its north-west side and north-east point. There is anchorage in 7 fathoms, off the north-east end of this island.

GREEN ISLAND, of which the centre lies E. $\frac{1}{4}$ N. 3 miles from the north-east point of Kangaroo island, is $1\frac{1}{4}$ miles long, North and South, and one-third of a mile broad at the centre, where it rises to a hill. A cluster of islets extends nearly a mile northward from the north end of the island. There is deep water close round the southern half of Green island, but there are only $2\frac{1}{2}$ to $1\frac{1}{2}$ fathoms along the southern edge of a shoal which connects the north end of the island with the main-land. There is anchorage in 4 fathoms, at about one-third of a mile off the east side of the island.

SOUNDINGS.—There are 7 to 13 fathoms between Kangaroo and Green islands, from whence the depth of water gradually decreases northward, to 4 and 5 fathoms between the easternmost Reef islet and the small island to the eastward of it.

CHAPPELL ISLANDS are three in number, with numerous islets and rocks, lying S.W. by W. $\frac{3}{4}$ W. $4\frac{1}{2}$ to $12\frac{1}{2}$ miles from the south-west point of Flinders island. Goose isle, the westernmost of the group, which lies S.W. by W. $\frac{3}{4}$ W. $12\frac{1}{2}$ miles from the south-west point of Flinders island, is $1\frac{1}{2}$ miles long, N.N.W. and S.S.E., and half a mile broad, with an islet

about a quarter of a mile in extent, close off its north-west extreme. There are 21 fathoms close to the south point, and 7 to 9 fathoms near the east side of Goose isle.*

THE LIGHT-HOUSE on Goose isle, which is situated at a quarter of a mile from its south point, and in lat. $40^{\circ} 18' 5''$ S., long. $147^{\circ} 49'$ E., is 74 feet high, the upper part being *red* and the lower *white*; it exhibits at the height of 135 feet above the sea, a fixed light, visible from the westward, between the bearings of S.S.E. $\frac{1}{2}$ E. and N.W. $\frac{1}{2}$ W., at the distance of 20 miles. To the eastward of these bearings the light is from many points of view, eclipsed by intervening islands.

BADGER ISLAND.—The north-west and north-east points of this, the largest island of Chappell group, lie nearly E. by N., the former 2, and the latter 5 miles from the north point of Goose isle. From the north-west point the western side of Badger island trends S. by E. $\frac{1}{2}$ E. 2 miles to its south-west point, from whence the southern and eastern shores of the island sweep round $4\frac{1}{2}$ miles to its north-east point. The north side forms a bay, extending from the north-east point W. $\frac{1}{2}$ S. $1\frac{1}{2}$ miles, and having 9 to 3 fathoms across its entrance. The western point of this bay has a reef projecting nearly one-third of a mile from it, between which and the north-west point of the island is a projecting point fringed by a reef. The south-eastern part of the island rises to a range of hills extending from the north-east to the south-west point, and attaining the height of 200 feet. A reef, with a small islet on it, extends two-thirds of a mile from the east end of the island.

The channel between Goose and Badger islands, which is $1\frac{3}{4}$ miles wide, has 7 to 20 fathoms water on its western side; and there is probably deep water in the middle and on the eastern side of the channel, where no soundings at present appear on the Admiralty chart.

DOUBLE ROCK, S.E. by E. $\frac{1}{2}$ E. $5\frac{1}{4}$ miles from Goose Isle light-house, appears on the chart as two small islets on a reef, with a larger islet—the southernmost of the Chappell group—at S.S.E. 1 mile from it: a reef projects a quarter of a mile from the south-west side of the islet, and there are some rocks between it and Double rock. At N.N.E. $\frac{1}{4}$ E. $2\frac{1}{2}$ miles from Double rock are two small islets close together, with rocks about them, extending about half a mile North and South, the northern islet having a reef projecting a quarter of a mile to the northward.

MOUNT CHAPPELL, the north-easternmost of the Chappell islands, extends N. by E. $\frac{3}{4}$ E. three-quarters of a mile to $2\frac{1}{4}$ miles from the north-east point of Badger island, and is 1 mile broad; it rises to a smooth round hill, 570 feet high, visible in clear weather, at the distance

* See Chart of Banks strait, No. 1,706; scale, $m = 0.5$ of an inch.

of 24 miles. At a quarter of a mile off the western side of Mount Chappell island is a small islet, from which a chain of rocks and reefs extends 2 miles to the northward. This islet is on the outer edge of a reef, which encloses all but the north-east end, and about $1\frac{1}{2}$ miles of the southern part of the island, and extends about 2 to 3 cables' lengths from the shore. A sunken rock lies a quarter of a mile off the south point, and a dry one at half a mile off the north-east end of the island.

There is a channel two-thirds of a mile wide, with 8 to 10 fathoms, between Badger and Mount Chappell islands, with apparently no other sunken dangers than the rock off the south point of the latter island.

SOUNDINGS.—There are 10 to 24 fathoms from Hummock island, and 12 to 24 fathoms from the northernmost Reef isle to Goose isle, and from thence 21 to 19 and 14 fathoms to Green island. There appear but few soundings about the Chappell islands; but from the channel between Goose and Badger islands to about 1 mile northward of Double rock there are 15 to 18 fathoms. At N.E. by E. $1\frac{1}{2}$ miles from Double rock there are irregular soundings in 9 to 12 fathoms, with decreasing depths to 5 and $4\frac{1}{2}$ fathoms on the east side of the two islets off the south-east extreme of Badger island. From thence to about half a mile eastward of Mount Chappell there are irregular soundings in 9 to 6 fathoms; and between Mount Chappell and the bay immediately to the south-eastward of Green island there are more regular soundings, decreasing from 16 fathoms at 1 mile north-eastward of Mount Chappell, to 8 fathoms in the middle of the bay.

THE SOUTHERN COAST of Flinders island, from its south-west point, sweeps round E. by S. $\frac{1}{4}$ S. $3\frac{3}{4}$ miles to the south point of the island, and from thence N.E. $\frac{3}{4}$ E. $3\frac{1}{2}$ miles to the entrance point of Badger corner. This coast consists of a series of small bights, with apparently steep points between them.

BADGER CORNER is a small cove in the western corner of a bay, which extends from the south-east point of the cove E.N.E. 4 miles, and is $1\frac{3}{4}$ miles deep. This bay is mostly occupied by small islands and shoals, with generally very shallow water between them, and is fronted by the two Dog isles, which, together with bank between them, extend E. $\frac{1}{2}$ N. two-thirds of a mile to $3\frac{1}{2}$ miles from the entrance point of Badger corner. Between the western Dog isle and Badger corner some shoals extending from S.W. to N.E., divide the opening into two channels: that on the north-west side, which is about 1 cable wide, with 2 to 6 fathoms water, leads into Badger corner; and that on the south-east side of the shoals, with 7 to 4 fathoms water, leads into the bay, to the north-eastward.

DOG ISLES are two in number, with several rocks and shoals about them. The western isle is about half a mile in extent, and is connected by

a shoal bank with the eastern and larger island, which is 2 miles long, W. by N. $\frac{1}{2}$ N. and E. by S. $\frac{1}{2}$ S., and half a mile to three-quarters of a mile broad. A rock above water, lies nearly half a mile off the south point of the western isle; and two small islets lie W.S.W., one at a quarter of a mile, and the other 1 mile, from the south-east point of the eastern isle. The latter islet is on the northern edge of the north-easternmost of a range of shoals extending S.W. by W. nearly 3 miles from the islet; there is a very narrow, but deep, channel between the north-easternmost extreme of these shoals and the eastern Dog isle. The northern side of the western, and the north-west point of the eastern Dog isles have rocks close off them; and narrow banks extend from the north-west point of the western isle, nearly 3 miles to the eastward, along the northern sides of both islands, at the distance of half a mile to a quarter of a mile from them.

The bay to the northward of the Dog isles is divided into two bights by a point, with rocks about it, lying N.E. $\frac{1}{4}$ N. 3 miles from the entrance point of Badger corner. The western bight, in the middle of which are two small islets, is nearly filled by a shoal flat; and nearly midway between the eastern bight and the eastern Dog isle is an island half a mile in extent, having rocks and shoals, with intermediate soundings in 2 to 7 fathoms, between it and the narrow bank to the southward of it. There is a cluster of rocks above water, between the island and the east shore of the bay.

The coast from the east point of the bay, just described, extends N.E. by E. $\frac{1}{2}$ E. $2\frac{1}{4}$ miles to the south-east extreme of Flinders island, and from thence it trends N. by E. $\frac{1}{2}$ E. $1\frac{1}{4}$ miles to the mouth of a lagoon extending above 2 miles to the north-westward and nearly 2 miles to the south-westward from its mouth.

NORTH-EAST and EASTERN SIDES of FLINDERS ISLAND.—From the north point of Flinders island, which lies N.E. by E. $\frac{3}{4}$ E. 5 miles from the north-west point, the north-east side of the island extends in a direct line of sandy beach S.E. $\frac{1}{4}$ E. 17 miles to a small inlet, and from thence E. $\frac{3}{4}$ S. $5\frac{1}{4}$ miles to the east point of the island. Small reefs project from the shore between the inlet and the point. Quoin hill, S.S.W. $3\frac{1}{2}$ miles from the north point of Flinders island, rises to the height of 730 feet; but there are no conspicuous objects along this coast between this hill and the Patriarchs, three remarkable peaks, rising from the low sandy land behind the east point of the island, and separated from the mountainous ranges to the westward by a low sandy plain. The north-easternmost and most elevated of the Patriarchs bears S.E. $\frac{1}{2}$ E., distant 19 miles from the north point of Flinders island, and is 830 feet high.

BEAGLE SPIT.—At about $3\frac{1}{2}$ miles to the south-eastward of the north point of Flinders island a dangerous sandy spit stretches out from the shore $4\frac{1}{2}$ miles in a north-east direction, with 4 fathoms at half a mile off

its extremity : from the north-east extreme of this spit the north point of Flinders island bears W. $\frac{1}{4}$ S., distant 6 miles. There are soundings in 10 to 17 fathoms between the Sisters and the end of the spit; and from 7 fathoms at two-thirds of a mile S.E. of it, there are regular soundings in 11 and 12 fathoms to the Babel isles, off the east point of the island.

BABEL ISLES, so named by Captain Flinders from the discordant and various notes of the innumerable birds on them, lie E.N.E. between 2 and 4 miles from the east point of Flinders island, and consist of one principal island, nearly 2 miles long, North and South, and two rocky islets lying close off its south-east side. The former is partially covered with tufted grass and brushwood, and has a remarkable pyramidal hill near its northern end, which is almost separated from the rest of the island by a deep notch. This pyramid bears from the north-eastern Patriarch N.E. by E., distant 6 miles. The intermediate space contains small dry rocks surrounded with breakers nearly midway, and is otherwise so contracted by shoal spits of sand, which project from each side, as to preclude the possibility of any vessel using it.

The other isles of this cluster are low, rocky, and very small, without any safe passage among them, except for boats; but they are safe to approach on the east side, having 10 fathoms water at the distance of half a mile.

In north-west winds, a vessel might anchor on the south-west side of Babel isles, sheltered by the sandy spit extending from Flinders island. The whole group is much frequented by shags, sooty petrels, and other sea birds, and was formerly the resort of numerous seals.

SOUNDINGS.—For 3 miles to the eastward of the north-eastern Sister isle there are regular soundings in 14 to 15 fathoms, and from thence 16 to 24 fathoms to 7 miles north-eastward of Babel isles.

TIDES.—It is high water at the Babel isles, full and change, at 10h. 5m.; springs rise 7 feet. The north-east stream begins here.

The eastern coast of Flinders island, from the east point, trends S.S.E. 15 miles, in nearly a direct line of sandy beach, to the south-east extreme of the island. There are no remarkable objects along this coast, but there are several swamps and lagoons; the northern of the two lagoons lying between the Patriarchs and the shore, and the other close to the shore at 7 miles to the southward of the east point.

FRANKLIN INLET, which separates Flinders island from Barren island, to the southward, is 4 miles wide, but is thickly strewed with islands and shoals, and the eastern entrance is almost blocked up by sand-banks.

ANDERSON ISLES are three in number, with several small islets and rocks, situated on a shallow bank which divides the western entrance of

Franklin inlet into two channels. The western isle, on which were some sealers' huts, lies near the middle of the bank ; it is about 1 mile long, North and South, two-thirds of a mile broad, and rises to a hill, bearing S.E. $\frac{1}{4}$ E., distant $4\frac{1}{2}$ miles from the south-west point of Flinders island. A small islet lies one-third of a mile to the north-eastward, and a rocky shoal extends half a mile to the southward from the island. The bank stretches W. by N. $3\frac{1}{2}$ miles from the western Anderson isle, and forms a spit, with two islets on it, nearly midway between the island and the west extremity of the spit.

The eastern Anderson isle extends N.E. by E. $\frac{1}{2}$ E. from three-quarters of a mile to $2\frac{1}{2}$ miles from the east side of the western island, and is a quarter of a mile to half a mile broad, with two rocks above water at one-third of a mile off its south-west point, and others close off its east point, where the bank projects half a mile eastward from the island.

The northern channel of Franklin inlet, between the south coast of Flinders island and the Anderson isles and bank, is 2 miles wide in its western entrance, from whence it contracts to barely 1 mile in width between the south point of Flinders island and the western Anderson isle. From hence it becomes wider for about 2 miles to the eastward, where it divides into two channels ; one trending north-eastward to Badger corner, and the other continuing eastward, between the eastern Anderson isle and the shoals which extend south-westward from the Dog isles. Franklin inlet has not been closely sounded ; but there are irregular depths of 4 to 10 fathoms in it.

THE SOUTHERN SHORE of Franklin inlet is formed by Long isle and the northern coast of Barren island from Long isle to the north point of the island.

LONG ISLE, the south-western point of which lies E. by S. 9 miles from Goose Isle light-house, is $2\frac{1}{2}$ miles long, N.E. by E. and S.W. by W., and one quarter to three-quarters of a mile broad, with its shores closely bordered with rocks. This island is separated from Barren island by a channel three-quarters of a mile to half a mile wide, with 7 to 5 fathoms water in its south-western part ; but its north-eastern entrance appears to be barred across by shoals.

From abreast of the eastern point of Long isle the northern coast of Barren island takes a N.E. $\frac{1}{4}$ E. direction $2\frac{1}{4}$ miles to a point from which a reef, with a cluster of islets and rocks on it, projects N.N.W. $\frac{1}{2}$ W. three-quarters of a mile. Midway between these islets and the north-eastern end of Long isle is an islet about a quarter of a mile in extent. Two 3-fathoms shoals which lie respectively N.N.W. 1 mile and N.N.E. $1\frac{1}{2}$ miles from this islet, are probably the southern extremes of shoals

extending from Anderson bank. Between these shoals and the Chappell islands there are regular soundings in 7 to 9 fathoms.

The southern shore of Franklin inlet, from the point, with the reef and islets off it, extends E. by N. $\frac{1}{4}$ N. $2\frac{3}{4}$ miles to the foot of a small hill, between which and a projecting point N.E. by E. $\frac{1}{2}$ E. $3\frac{1}{4}$ miles from it, the coast forms a bay $1\frac{3}{4}$ miles deep; but it is filled by a flat, the outer edge of which sweeps round from the south-west point to the north-westernmost of three small islets extending half a mile from the north-eastern point of the bay. At about halfway from the south-western point of this bay to the western Anderson isle is a bank upwards of three-quarters of a mile long, N.W. and S.E., between which and the reefs to the north-westward of it there is a narrow passage, with 5 fathoms water in it.

There is a line of irregular soundings of 4 to 15 fathoms from the islet off the north-eastern end of Long island to this narrow passage; with 6 fathoms between the reef with the islets on it, and the 3-fathoms shoal at one-third of mile to the north-westward of the reef; between which and the narrow passage at half a mile south-eastward of the western Anderson isle, there are 15 to 7 fathoms.

Between the north-eastern point of the bay, last noticed, and the narrow projecting north point of Barren island, at N.E. by E. $\frac{1}{2}$ E. $5\frac{1}{2}$ miles from it, is a bay $1\frac{1}{2}$ miles deep; but, like that to the south-westward, this bay is filled by a flat, the outer edge of which extends from three-quarters of a mile north-eastward of its south-western point, to a patch of sunken rocks lying W. by S. $\frac{1}{2}$ S. 2 miles from the north point of Barren island. Between the south-western point of this bay and a ledge of sunken rocks projecting from the shore at 3 miles to the eastward of it, there are two bights in the coast; and in the north-eastern part of the bay there are several small islets and reefs.

VANSITTART ISLE, the south point of which lies W. by S. $\frac{1}{2}$ S. one mile from the north point of Barren island, is $2\frac{1}{4}$ miles long, N.N.W. and S.S.E., and $1\frac{3}{4}$ miles broad at its southern end; it rises in the centre, and has a hill on its south-west point, on the north side of which is a small sandy bay, where were formerly some sealers' houses. The southern part of Vansittart island is connected with the shoals to the southward; but between the west side of the island and the Dog isles there is a channel nearly $1\frac{1}{4}$ miles wide, having 6 to more than 9 fathoms water, with a small islet lying in mid-channel, close to the northward and north-eastward of which there are $2\frac{1}{2}$ and 3 fathoms.

From the narrow 5-fathoms passage at half a mile south-eastward of the western Anderson isle, to one mile south-eastward of the eastern isle there is a line of soundings in $4\frac{1}{4}$ to 6 fathoms, and from thence to Vansittart island the channel is 2 miles wide, with 6 to 8 fathoms water.

The eastern entrance of Franklin inlet is almost blocked up by sand-banks, with heavy breakers on them, extending from the south-east extreme of Flinders island to the north point of Barren island, and stretching out $5\frac{1}{2}$ miles to the eastward from Vansittart island. There was a shifting channel, with 2 to 4 fathoms water, between the northern part of these banks and the south-eastern extreme of Flinders island: and there is a narrow channel, with 4 to 9 fathoms, close along the north-east side of Vansittart island; but it appeared to be blocked up to the south-eastward.

There are 2 fathoms water at about three-quarters of a mile to the eastward of the north point of Barren island, and 4 to 7 fathoms between half a mile and three-quarters of a mile from the southern edge of the sand-banks to the eastward; from whence the depths gradually increase to 19 fathoms at about 10 miles to the eastward of the summit of Vansittart island.

TIDES.—At the eastern entrance of Franklin inlet there is a meeting of the flood streams, one coming from the N.N.E., and the other from S.E. The flood stream sets to the westward through Franklin inlet, and from thence about W.N.W. on the north side, and W.S.W. on the south side of the Chappell islands; and the ebb in the contrary direction. In the northern channel of the inlet the streams run $1\frac{1}{2}$ to $2\frac{1}{2}$ knots, and in the southern channel 2 knots.

BARREN ISLAND, the second in size of the Furneaux group, extends from cape Sir John, its west point, E. $\frac{3}{4}$ N. $22\frac{1}{2}$ miles to cape Barren, its east point, and is 12 miles broad between its north and south points. The island is high, rocky, and irregular, with some rounded hills near its north-western coast; one of which, named mount Munro, at N.E. $\frac{1}{2}$ E. $6\frac{1}{2}$ miles from cape Sir John, rises to the height of 2,300 feet above the sea. There is also a remarkable peak on the south-east part of the island.

CAPE SIR JOHN, the west point of Barren island, has a reef projecting a short distance from it, and three small islets lie respectively, S.W. $\frac{3}{4}$ W., S.E. $\frac{3}{4}$ S., and E. by S., each distant one mile from the cape. To the northward of the cape the coast trends N. by W. to one mile southward of the south-west point of Long isle, and is bordered with rocks extending about a quarter of a mile from the shore. An islet surrounded by a reef, lies S.S.W. $\frac{1}{4}$ W. 2 miles from the south-west point of Long island.

Between 14 fathoms, at about three-quarters of a mile south-westward of Long island, and 15 fathoms at half a mile off cape Sir John, there are 14 to 9 fathoms, with a 9-fathoms channel, between the islet just noticed, and the shore. But vessels should approach this cape with caution, on account of the detached rocks off it.

Between cape Sir John and a point with a cluster of rocks close off it, lying E. by S. $\frac{1}{4}$ S. $2\frac{1}{2}$ miles from the cape, the coast forms two bays,

separated from each other by a projection, having an islet close to the southward of it, lying E. by S. $\frac{1}{4}$ S. $1\frac{3}{4}$ miles from the cape. The north-eastern bay appears not to have been sounded, but the south-eastern and smaller bay has 9 to 5 fathoms water; it is, however, exposed to the south-westward, and its shores appear to be bordered with rocks.

From the south-east point of the latter bay an irregular rocky coast trends S.E. by E. 1 mile, and from thence E. $\frac{1}{2}$ N. $1\frac{1}{2}$ miles, to a projection, between which and Wombat point, at E. $\frac{1}{2}$ N. $2\frac{1}{2}$ miles from it, there is a bay one mile deep in its eastern part. A sunken rock lies S. by E. $\frac{1}{2}$ mile from the west point of the bay, and another sunken danger lies three-quarters of a mile to the westward of Wombat point. A rocky ledge projects about one-third of a mile from the middle of the north shore, and another ledge extends nearly the same distance from the east shore of the bay.

WOMBAT POINT has a small islet and rocks close off it, connected by a reef, which projects nearly a quarter of a mile to the westward and one-third of a mile to the southward from the point.

A sandy bay extends from Wombat point E. $\frac{1}{2}$ N. $3\frac{3}{4}$ miles to Sloping point, which has a reef projecting about a quarter of a mile to the south-westward from it. Battery islet, which lies near the middle of the bay, was so named from its having four rocks upon it resembling guns.

MIDDLE BANK is a long, narrow shoal, fronting the bay just noticed, the east end of which lies S.W. by W. two-thirds of a mile from Sloping point; but the extent of the bank to the westward appears not to have been ascertained.

KENT BAY extends from Sloping point E. $\frac{1}{2}$ S. $5\frac{1}{2}$ miles to Passage point, and is 3 miles deep. From Sloping point the north-western shore trends N.E. $\frac{1}{2}$ N. 3 miles to a small point, at E. by N. $\frac{3}{4}$ N. three-quarters of a mile from which a projection of the northern shore divides the head of the bay into two bights.

SLOOP ROCK.—ANCHORAGE.—Sloop rock, N.E. $\frac{1}{2}$ E. $2\frac{1}{4}$ miles from Sloping point, is situated on a reef of dry rocks, separated from the north-western shore by a passage about a quarter of a mile wide; but the rock is connected by shoals with the eastern shore of the bay. To avoid these shoals when working through Armstrong channel, across the entrance of the bay, a vessel should not go to the northward of a line between Sloop rock and Passage point, the south-east point of Kent bay. A channel leads close along the north-western shore to the western bight at the head of the bay, with the soundings gradually decreasing from 20 fathoms on the east side of Wombat point to 4 fathoms between Sloop rock and the shore. Several vessels may here lie at anchor in 4 or 5 fathoms, sheltered from all winds. From this anchorage the soundings decrease to one fathom at three quarters

of a mile northward of Sloop rock ; and between the rock and the head of the bay, there are irregular soundings of 4 to 2 fathoms.

The eastern bight of Kent bay—where there was a run of fresh water—is filled by a shoal flat, which extends in patches along the eastern shore, nearly to Passage point. From 14 fathoms at $1\frac{3}{4}$ miles W.N.W. of this point to a 3-foot bank at $1\frac{1}{4}$ miles eastward of Sloop rock, there are irregular depths of 16 to 2 fathoms, and between this bank and the entrance of the eastern bight there are 4 to $1\frac{1}{2}$ fathoms water.

THE NORTH-EAST COAST of Barren island, from its north point, forms a slight curve, extending S.E. by E. 8 miles to the north-east point of the island, which is bordered with sunken rocks, and is nearly separated from the land behind by a narrow lagoon. For the first $2\frac{1}{2}$ miles from the north point several reefs project from the sandy coast, and at 2 miles farther to the south-eastward, a patch of dry and sunken rocks lies within half a mile of the shore. There are two lagoons close together, behind the beach, at $3\frac{1}{2}$ miles to the south-eastward of the north point, and at 2 miles to the north-westward of the north-east point, is an inlet barred across at its entrance.

Between the north-east point of Barren island and cape Barren, S.S.E. $\frac{1}{2}$ E. $3\frac{3}{4}$ miles from it, the coast forms a double bay encumbered with sunken rocks.

CAPE BARREN, the east point of Barren island, is a low projecting point, with a reef extending nearly a mile to the eastward from it, on which is a flat rocky islet, with a peaked rock. There are 17 fathoms water at three-quarters of a mile to the eastward of the reef ; but there are strong tide-ripples near it.

Between cape Barren and Cone point, which lies S.W. $\frac{1}{4}$ S. 5 miles from the cape, there are two sandy bays, the north-eastern of which extends 3 miles from cape Barren, and is one mile deep ; but its northern and western shores are bordered with sunken rocks. The south-western bay is two-thirds of a mile deep, with a narrow lagoon extending $1\frac{1}{4}$ miles along the back of the beach. The intermediate point has a reef projecting a short distance from it.

CONE POINT is a rocky projection, on which are two whitish cones shaped like rhinoceros' horns ; a reef extends about a quarter of a mile from the point.

SOUNDINGS.—From 7 fathoms, at 2 miles eastward of the north point of Barren island the soundings increase to 14 fathoms at $1\frac{1}{2}$ miles off the north-east point, and 17 fathoms at $1\frac{1}{2}$ miles off cape Barren ; from thence to about 3 miles eastward of Cone point there are 16 to 17 fathoms.

PASSAGE POINT, the south extremity of Barren island, lies W. by S. $\frac{1}{4}$ S. $2\frac{1}{4}$ miles from Cone point ; it is closely fronted with dry

and covered rocks, and forms the west point of a bay nearly 1 mile deep, with 14 to 20 fathoms water in it. Behind the sandy beach of this bay is a lagoon, the water in which is of a red colour and a little brackish. On the west side of Passage point there are several smaller ponds, which contain good water.

ARMSTRONG CHANNEL, which separates Barren island from Clarke island, to the southward of it, is about 13 miles long, following the indirect course of its fairway channel, and is 4 miles wide at its western entrance ; but it is there divided into two passages by a group, of which the largest is Preservation isle.

PRESERVATION ISLE, the west point of which lies S.E. $\frac{1}{2}$ E. $4\frac{1}{4}$ miles from cape Sir John, is $1\frac{3}{4}$ miles long, W.N.W. and E.S.E., and about half a mile broad at its western end, from whence a cluster of rocks above water extends half a mile to the north-westward. Dry and covered rocks surround this island, except between its south-east point and one mile north-westward of it, where a sand-bank stretches out 2 miles in an E. by N. direction, and is half a mile broad, with 1 foot to $2\frac{1}{2}$ fathoms water on it, and 9 fathoms close to its eastern spit.

HAMILTON ROAD, at the south-east extreme of Preservation isle, is a small bight formed between the reef which projects from the south-east point and the bank stretching out to the eastward from the island. The anchorage is in 4 to 3 fathoms, with good holding sandy bottom, at a quarter of a mile from the shore, sheltered from all winds except those between South and S.S.E. ; and these do not throw in much sea.

Preservation isle in 1842, was inhabited by some sealers, who lived in a few rude huts on a bleak flat, with scarcely a tree near them, but sheltered from the west by low granite hills. A number of dogs, goats, and fowls constituted their live stock.

RUM ISLET, which lies close to the south point of Preservation isle, is about a quarter of a mile in extent ; it has a reef projecting a short distance from its southern end, and is joined to Preservation island by a reef of dry and covered rocks, which, together with the islet, protects Hamilton road from the south-westward.

NIGHT ISLET, S.W. by W. $1\frac{1}{2}$ miles from the west point of Preservation isle, is a rock one quarter of a mile long N.W. and S.E., with a reef of dry and covered rocks extending nearly one mile from it in a N.N.E. direction. Two smaller rocks lie to the southward of Night isle, one close to it, and the other at the distance of two-thirds of a mile ; they appear to be connected by a reef, which projects about a quarter of a mile from the southern rock.

SOUNDINGS.—There are 14 to 7 fathoms from the western rock off cape Sir John to the north-east end of the reef projecting from Night

islet ; and from thence to half a mile south-westward of Rum islet there are 14 to 17 fathoms.

On the north side of Preservation isle and bank, the passage is little more than three-quarters of a mile wide, with 15 to 5 fathoms water ; and the navigable space is contracted to half that width by rocks projecting from both shores, besides the sunken rock nearly in mid-channel, and a 2-fathoms shoal, which lies between a quarter of a mile and half a mile N.E. from the east spit of the bank which stretches eastward from Preservation isle.

The passage to the southward of Preservation isle, which is the better entrance into Armstrong channel from the westward, is $1\frac{3}{4}$ to $1\frac{1}{4}$ miles wide, and has 13 to 4 fathoms water, with no other danger than the rocks, which lie a little way out from either shore.

THE SOUTHERN SHORE OF ARMSTRONG CHANNEL is formed by the northern coast of Clarke island, which between two rocky points, lying S.E. 2 miles and E. $\frac{1}{2}$ S. $2\frac{1}{4}$ miles from the south-east point of Preservation isle, forms two bights, separated from each other by a point having, like the two others, a reef projecting a short distance from it. From the north-easternmost of these three points the coast curves N.E. by E. $\frac{3}{4}$ E. $2\frac{3}{4}$ miles to a rocky projection, between which and the north-east point of the island, that lies $2\frac{1}{2}$ miles farther in the same direction, there is a bay 1 mile deep, which appears not to have been sounded.

SEAL ROCKS are a cluster of dry and sunken rocks on a shoal projecting about one-third of a mile from the north-east point of Clarke island, leaving a channel two-thirds of a mile wide, between them and Sloping point.

The fairway from the western entrance of Armstrong channel, by the passage southward of Preservation isle, leads in an E.N.E. direction to the narrows between Sloping point and Seal rocks ; the soundings increasing from 4 fathoms at $1\frac{1}{2}$ miles eastward of Rum islet, to 10 fathoms between Middle bank and the point to the south-westward of it, and to more than 17 fathoms between Sloping point and the Seal rocks.

From the low sandy north-east point of Clarke island its eastern coast extends in a South direction $3\frac{1}{4}$ miles to the east point of the island. It is partly bordered by rocks and reefs, and is fronted by a bank stretching out $2\frac{1}{2}$ miles eastward to Forsyth isle, which forms the west side of the eastern entrance of Armstrong channel. The northern edge of this bank—which bounds Armstrong channel to the southward, from the north-east point of Clarke island to the eastern entrance—sweeps round eastward and south-eastward $3\frac{1}{2}$ miles to the north end of Forsyth isle.

FORSYTH ISLE, the north end of which lies E. $\frac{3}{4}$ S. 3 miles from the north-east point of Clarke island, is $1\frac{1}{2}$ miles long, North and South, and

one-third of a mile broad. A covered rock lies close off the northern end, and a reef projects a short distance from the south point of the island, at three-quarters of a mile to the south-westward of which is a sunken rock.

PASSAGE ISLE, which forms the eastern side of the eastern entrance of Armstrong channel, is separated from Forsyth isle by a passage $1\frac{1}{2}$ miles to half a mile wide. It is $1\frac{2}{3}$ miles long, N.N.W. $\frac{1}{2}$ W. and S.S.E. $\frac{1}{2}$ E., and is three-quarters of a mile broad at its northern end from whence it narrows to its south point, which has a reef projecting about 2 cables' lengths to the southward, with 12 fathoms water close outside it. A reef with rocks on it, extends N.N.W. two-thirds of a mile from the north point of Passage isle; and between the north-east extreme of the island and Passage point is a channel nearly a quarter of a mile wide, with 13 to 6 fathoms water in it.

There are irregular depths, ranging from 4 to 10 fathoms, in the eastern entrance of Armstrong channel, and 8 to 14 fathoms for nearly $1\frac{1}{2}$ miles to the northward of it, by keeping on the eastern side; from whence there are 6 to 10 fathoms along the northern edge of the bank to the narrows, between Seal rocks and Sloping point.

Although there are many shoals of sand on each side of the wider parts of Armstrong channel, a passage of sufficient width and depth is swept out by the tide streams, for ships to go through in safety. The bottom is either rocky or sandy: rocky in the deep and narrow parts, where the stream runs 3 or 4 knots; and sandy in the bights and shoaler places.

Water.—Good fresh water may be collected, at certain seasons, in small pools near the south-eastern end of Preservation isle; but that which drains from the rocks appears to possess some pernicious qualities, as it was first used by the wrecked crew of the ship *Sydney Cove*, until several of them died. Small pools or runs of water are to be found almost everywhere under the high parts of Barren island, and it is probable there may be some on Clarke island.

Birds.—Preservation isle and the adjacent rocky islets are visited by numerous sea birds, including the barnacle goose, a few black swans, and great numbers of the sooty petrel; which latter burrows in the ground like rabbits, and when skinned and smoked, is passable food.

TIDES.—It is high water in Hamilton road, Armstrong channel, full and change, at 11h. 10m.; springs rise 6 feet, neaps 3 feet. The stream follows the direction of the channel and the passages North and South of Preservation isle; the flood setting to the westward, and the ebb to eastward, $1\frac{1}{2}$ to 2 knots. In the deep and narrow parts of the channel the stream has been known to run 3 or 4 knots.

CLARKE ISLAND, the southernmost of the Furneaux group, and which forms the north side of Banks strait, is 8 miles long, N.E. $\frac{3}{4}$ N. and S.W. $\frac{3}{4}$ S., and 6 miles across its south-western part. The most elevated part of the island appears to be a hill, 690 feet high, near its northern coast, bearing E. by S. distant $3\frac{1}{2}$ miles from the south-east point of Preservation isle. From the north-western point of Clarke island, already noticed, its western coast trends S. by E. $\frac{1}{2}$ E. $3\frac{1}{4}$ miles to Lookout head, the south-west point of the island. Midway between the two points is a bight, fronted by several rocks above water, the southernmost of which lies a quarter of a mile off the south point of the bight. This coast is rocky, with breakers along it, extending a quarter of a mile from the shore.

LOOKOUT ROCKS, N.W. by W. $1\frac{1}{4}$ miles from Lookout head, are two in number, on the southern part of a reef three-quarters of a mile long, North and South, and about a quarter of a mile broad; a sunken rock lies midway between these rocks and the shore.

LOOKOUT HEAD is enclosed by rocks and reefs projecting a quarter of a mile; and a small detached reef, with two dry rocks upon it, lies one-third of a mile to the south-eastward of the head. Between Lookout head and the south point of Clarke island, which lies E. by S. $\frac{1}{2}$ S. $2\frac{3}{4}$ miles from the head, the south-west coast of the island forms an exposed bay 1 mile deep, with reefs extending about one-third of a mile from the north-west and eastern shores of the bay.

The south point of Clarke island is enclosed by a reef of sunken rocks, between which and the south-east extreme of the island, at N.E. by E. 1 mile from the south point, there is a small exposed bight. From the south-east extreme of Clarke island its eastern coast extends N. by E. $\frac{1}{2}$ E. $3\frac{1}{2}$ miles to the rocky east point of the island, about $2\frac{1}{2}$ miles of it consisting of a sandy beach.

Two small islets, or rocks above water, with sunken rocks close round them, lie close together, S.S.E. $\frac{1}{2}$ E. $1\frac{3}{4}$ miles from the east point of Clarke island, with a sunken rock midway between them and the shore, to the north-westward.

MORIARTY BANK is a dangerous shoal extending E. by N. 1 to 4 miles from the south-east extreme of Clarke island. There are two rocks above water on the north-east extreme of the bank; one bearing East, distant 4 miles, and the other E. by N. $\frac{1}{4}$ N. $3\frac{1}{2}$ miles from the south-east extreme of the island, each being surrounded by covered rocks, with a reef, having 3 to 4 fathoms on it, extending S.S.E. $1\frac{1}{4}$ miles from the outer rock. There are 5 to 10 fathoms close to this reef, with increasing depths to 22 fathoms at $2\frac{1}{2}$ miles southward of the two rocks; and there are 19 fathoms at 1 mile southward of the bank.

CLEARING MARKS.—Mount William, near the north-east coast of Tasmania, bearing S. $\frac{3}{4}$ W. clears the outer, or eastern end of Moriarty bank ; and to pass to the southward of it, the south point of Clarke island must not be brought to the southward of W. by N.

SOUNDINGS.—From 7 fathoms on the east side of Rum islet, the soundings increase to 14 fathoms at two-thirds of a mile off the north-west point of Clarke island, and 18 fathoms at three-quarters of a mile westward of Lookout rocks ; there are 21 fathoms at 1 mile southward of Lookout point ; and from thence to 4 miles southward of the rocks on Moriarty bank, the soundings only range from 22 to 18 fathoms, except at S.S.E. $1\frac{1}{2}$ miles from the south point of Clarke island, where the plan of Bank strait shows 34 fathoms.

In approaching Bass strait from the westward, 80 fathoms will be found at 55 miles, 70 at 28 miles, and 60 fathoms at 7 miles to the westward of cape Wickham ; from thence the soundings along the west coast of King island decrease to 37 fathoms at 4 miles westward of Stokes point, the south extreme of the island.

In the Safest entrance to Bass strait from the westward, the soundings decrease from 65 fathoms at 25 miles W.N.W. of cape Wickham, to 30 fathoms at 4 miles southward of cape Otway, except at 18 miles southward of the latter cape, where there is a depth of 80 fathoms ; and at 8 miles to the north-eastward of this there are 25 fathoms ; but with the exception of the latter depth, the soundings decrease with some regularity, from 60 fathoms at 6 miles north-westward of cape Wickham, to 41 fathoms at about 9 miles south-eastward of cape Otway.

The soundings in Bass strait are tolerably regular, ranging from 30 to 48 fathoms, with generally 5 fathoms within a mile of its shores ; in thick weather, the navigator may know when he is approaching Hummock island and the other islands fronting the west side of Flinders island, by having less than 30 fathoms. The bottom mostly consists of sand and shells in the north-western and greater portion, and more of mud, marle, and ooze in the south-eastern part of the strait.

Between 35 fathoms at 20 miles eastward of the south extreme of Barren island, and 38 fathoms at about 40 miles north-eastward of the north point of Flinders island, the depths range from 20 to 42 fathoms, and from thence the soundings deepen rapidly to more than 200 fathoms in the direction of Ram head and Cape Howe.

ANCHORAGES in BASS STRAIT, WHEN GOING EASTWARD.—The most convenient places for anchoring in this strait, with foul winds, when going to the eastward, are :—

1st. Franklin road, under the north-west end of King island, where, the heavy sea being broken off by the New Year isles, the shelter from easterly winds must certainly be much more complete.

2nd. Port Phillip; anchoring just within the entrance, on the south side. When a fair wind comes, a ship can get out of the port by means of the strong tide streams.

3rd. Off the north-west extreme of Tasmania, between Three Hummock and Hunter islands; taking care not to anchor too near to the weather shore, lest the wind change suddenly.

4th. The bight between Wilson promontory and cape Liptrap, in case of necessity; but it is a place not to be recommended, from its being very dangerous should the wind shift to S.W.

5th. Kent group, for brigs and smaller vessels; in one of the small sandy coves under the eastern island.

6th. Furneaux group, between Clarke and Preservation islands. If the ship be not able to weather Clarke island, and pass out to the south-eastward when the wind comes fair, she may run through Armstrong channel, with a boat ahead and a good look-out.

When going Westward.—In case of foul winds, which, if the weather be thick or rainy, may be expected to fix at S.W. and blow strong, there are many places where a ship may anchor, to wait a change; but the following appear to be the most convenient:—

1st. West cove in Erith island, one of the Kent group.

2nd. Hamilton road, at the east end of Preservation isle.

3rd. Western port, under Phillip island; anchoring so soon as the ship is sheltered. A fair wind for going onward through the strait will take a ship out of this port.

4th. Port Phillip.

5th. Sea Elephant bay, on the east side of King island, where there is fresh water; or under the north-east end of that island, if the wind be from S.W.

And on the north coast of Tasmania there is anchorage:—

1st. On the south side of the largest Swan isle for small vessels, or under Waterhouse isle, 22 miles farther to the westward.

2nd. Port Dalrymple.

3rd. Port Sorrell; but it is accessible only to small vessels.

4th. Various places among the Hunter group.

CHAPTER VI.

TASMANIA.—NORTH AND WEST COASTS.

VARIATION from $8^{\circ} 40'$ to $10^{\circ} 35'$ East in 1868.

TASMANIA, the large island lying to the southward of Australia, was discovered in the year 1642, by the celebrated Dutch navigator Tasman, who bestowed on it the name of Van Diemen Land, in honour of the Governor-general of the Dutch possessions in the East. It is of considerable extent, being situated between the parallels of $40^{\circ} 38'$ and $43^{\circ} 39'$ S., and between the meridians $144^{\circ} 38'$ and $148^{\circ} 22'$ E., and is separated from the southern part of New South Wales by Bass strait.*

The north coast of Tasmania forms the south side of Bass strait, and occupies an extent of about 160 miles between capes Portland and Grim, its north-east and north-west points; and near the bottom of the bight, which it forms by curving inwards to the southward, are Ports Dalrymple and Sorrell, the former being the embouchure of the river Tamar. The whole of this shore lies generally in very smooth water, the prevailing winds being off the land, and the long south-westerly swell outside, being interrupted by the islands at the western entrance of the strait. Its navigation is represented to be free from dangers to within a mile of the shore and of the islands which lie off it; except in the neighbourhood of Port Dalrymple, where on the Hebe reef, lying $1\frac{1}{2}$ miles from the land, the ship of that name was lost in 1808.

The north-east extreme of Tasmania is singularly low, with a coast-range of sand-hills; from this level part, rise mounts Cameron and William, the former, in lat. $40^{\circ} 59'$ S., long. $147^{\circ} 56'$ E., is 1,730 feet high, and is the loftiest of a group of peaks cresting a ridge; but the latter, at N.E. by E. $\frac{1}{4}$ E. 12 miles from mount Cameron, is a solitary pyramidal hill 730 feet high, and used as a guide for vessels working through Banks strait.

EDDYSTONE POINT, in lat. $40^{\circ} 59'$ S., long. $148^{\circ} 22'$ E., projects about a mile from the line of coast, and is enclosed by dry and sunken

* See Charts of Bass strait, Nos. 1,695 and 1,695a; scale, $m = 0.2$ of an inch; Banks strait, No. 1,706; scale, $m = 0.5$ of an inch; and General Chart of Tasmania, with plan of D'Entrecasteaux channel, and approaches to Derwent river, No. 1,079; scale, $m = 0.11$ of an inch.

rocks, some of which extend upwards of half a mile to the south-eastward ; but there is a depth of 5 fathoms within a quarter of a mile of the extremity of the point.

TIDES.—It is high water at Eddystone point, full and change, at 9h. 39m. ; springs rise 7 feet.

From Eddystone point a rocky coast trends N.W. 10 miles to cape Naturaliste ; few of the rocky ledges which project from the shore between the point and the cape, extend beyond three-quarters of a mile.

GEORGE ROCK, N.N.W. 4 miles from Eddystone point, is the largest of a cluster of grey granite boulders, lying between 1 and 2 miles from the shore ; it is 66 feet high, and has one reef extending N.N.W. 1 mile, and another about half that distance to the southward.

BLACK REEF consists of a low dark rocky islet, lying N.W. $6\frac{1}{2}$ miles from George rock, with reefs extending S.E. by E. 1 mile, and N.W. three-quarters of a mile from it. There are tide-ripples about this reef ; and a patch of moored kelp in 14 fathoms, on which the sea breaks in heavy southerly gales, lies E.S.E. 3 miles from Black reef.

SOUNDINGS.—There are 42 fathoms at 13 miles off Eddystone point, and about 35 fathoms from thence to the same distance off cape Barren, the bottom being rock at about midway, and sand to the northward. From 15 fathoms at 1 mile off Eddystone point, the soundings decrease to $7\frac{1}{4}$ fathoms between George rock and the shore, and from thence increase to 14 fathoms at about three-quarters of a mile southward of the south-east extreme of Black reef, when the depth of water again decreases to 7 fathoms between Black reef and cape Naturaliste. There are 24 fathoms at 1 mile eastward of George rock, and from Black reef to 8 miles E. by N. $\frac{1}{2}$ N. from it, the soundings range from 14 to 20 and 19 fathoms.

MUSCLE RIVER is an inlet on the west side of a rocky headland, lying N.W. by W. $\frac{3}{4}$ W. $2\frac{1}{2}$ miles from cape Naturaliste. From the mouth of this inlet a sandy beach curves 4 miles in a N.W. by W. $\frac{1}{2}$ W. direction, the south-eastern and greater portion of which is fronted by a bank, extending $1\frac{1}{2}$ miles from the shore.

The coast from the north-western end of this beach takes a W. by N. $\frac{1}{2}$ N. direction nearly $6\frac{1}{2}$ miles to a point, at W. by S. $\frac{1}{2}$ S. $1\frac{1}{2}$ miles from which is cape Portland. For the first 2 miles the coast is rocky, and at $1\frac{1}{2}$ miles farther to the westward it is intersected by Little Muscle river, at half a mile north-westward of which a reef projects about a quarter of a mile from the shore.

ANCHORAGE.—There is anchorage off the mouth of Little Muscle river,

in about 5 to 7 fathoms, sand, sheltered from all westerly or southerly winds round to S.S.E.

CAPE PORTLAND, the northern extremity of the north-eastern part of Tasmania, is a peninsular projection, in lat. $40^{\circ} 44'$ S., long. $147^{\circ} 57' 40''$ E., and may be passed at the distance of a mile in 12 fathoms.

SWAN ISLES, which lie near the south side of Banks strait, and between $1\frac{1}{2}$ and 4 miles from the shore, just described, are three in number; the south-easternmost, and largest is $1\frac{3}{4}$ miles long, N.E. by E., and S.W. by W., and about half a mile broad, with several hummocks upon it. The other two, which are small islets, lie N.W. by N. 1 and $1\frac{1}{2}$ miles from the west point; and a dangerous patch of rocks, on which the sea breaks, lies N.W. by W. nearly $1\frac{1}{2}$ miles from the north-east point of the island. These islets and rocks are all connected with each other, and with the largest island by a reef having kelp upon it, and extending N.W. $1\frac{1}{4}$ miles from the north-western side of the island, and about the same distance N.E. and S.W. There are 6 to 8 fathoms within a quarter of a mile of the south-eastern side of the island.

LIGHT.—On the north-east extreme of the largest Swan isle, in lat. $40^{\circ} 43' 30''$ S., long. $148^{\circ} 8' 30''$ E., stands the light-house, which is a round tower 71 feet high, the upper part painted *red*, and the lower *white*; it exhibits a light revolving every minute, and, being 110 feet above the level of the sea, is visible in clear weather, at the distance of 14 miles from a ship's deck.

ANCHORAGE.—There is tolerable anchorage on the south-east side of the largest Swan isle, in 6 or 7 fathoms, at about a quarter of a mile off the south point of a sandy bay, where vessels may wait for tide, or a short time with north-west winds; but there is better anchorage off the mouth of Little Muscle river to the south-eastward, where a vessel can more easily get under way in south-east or easterly winds.

FOSTER ISLETS are two in number, lying respectively N.E. by E. $\frac{1}{2}$ E. three quarters of a mile, and N.E. $\frac{1}{2}$ E. $1\frac{3}{4}$ miles from cape Portland, and are connected with the coast by reefs and sunken rocks. From the outer islet foul ground, with tide-ripples on it, extends $1\frac{1}{2}$ miles northward to a sunken rock, from which cape Portland bears S.W. by S. and the light-house on Swan isle E. $\frac{1}{2}$ S.; but the position of this danger is doubtful. There are 9 fathoms water at $1\frac{1}{2}$ miles north-eastward of the outer Foster islet.

BANKS STRAIT, which separates the Furneaux group from the north-east part of Tasmania, is $11\frac{1}{2}$ miles across from Clarke island to the nearest part of the coast, between capes Naturaliste and Portland. It is not known

to contain any other dangers than those connected with the Swan isles, and the sunken rocks in the vicinity of the Foster islets.

THE SOUNDINGS across the eastern part of Banks strait, from 9 fathoms at 1 mile southward of the outer Moriarty rock, increase to 33 fathoms at 4 miles farther to the southward, and from thence decrease, with some regularity, to 7 fathoms at about 1 mile north-westward of cape Naturaliste. To the westward of this line of soundings the depths generally range from 28 to 16 fathoms. From the channel between Black reef and cape Naturaliste to that between the Swan isles and the coast, the soundings vary from 9 to 20 and 10 fathoms. The bottom in Banks strait consists of sand, and in some parts rock.

DIRECTIONS.—Banks strait is so wide and free from dangers, that the Admiralty chart will be a sufficient guide, even for a stranger, the chief dangers to be avoided being apparently the reef which extends from the Swan isles, and the foul ground and rocks to the northward of the Foster islets. It may, however, be noticed that a vessel from the south-eastward, may close the shore when mount William bears S. by W., as she will then be past Black reef and the rocks that lie off the coast to the south-eastward.

TIDES.—It is high water at the Swan isles, full and change, at 9h. 35m.; springs rise 6 feet, and neaps 3 feet. The flood stream comes from the eastward, and the ebb from the westward; the flood and the ebb are each of $6\frac{1}{4}$ hours duration at springs; but during neaps, the flood runs 7 hours and the ebb $5\frac{1}{2}$ hours. The interval of slack water never exceeded a quarter of an hour, and the western stream begins 30 minutes after low water at springs, and 50 minutes after it at neaps; while the eastern begins 40 minutes after high water at springs, and 10 minutes before it at neaps.

The velocity of the stream was from 1 to 3 knots, the strongest being the ebb, which at springs, and with a strong westerly breeze, attains a strength in the middle of Banks strait of nearly 4 knots, and causes, when opposed to the wind, a high topping sea, dangerous for small craft.

RINGAROMA BAY extends from cape Portland S.W. by W. $\frac{1}{4}$ W. 13 miles to Waterhouse point, and is $6\frac{1}{2}$ miles deep. Between cape Portland and a point at $2\frac{1}{4}$ miles to the southward of it, is a little bight affording anchorage for small craft: some small islets lie nearly 1 mile off the shore of the bight, the northernmost islet having a reef projecting a quarter of a mile to the northward.

From the south-eastern point of this little bight, the beach which forms the south-eastern shore of Ringaroma bay, curves S.S.W. 6 miles to Ringaroma river, and from thence the southern shore curves westward

5½ miles to Tomahawk river, close to the western entrance point of which is Tomahawk islet, connected with the point by a shoal. Between this islet and Waterhouse point the coast consists of a sandy bight and rocky points. There are 16 to 12 fathoms at 1½ miles from the south-eastern shore, and 9 to 4 fathoms within a mile of the south-western shore of the bay. Both rivers have fresh water within 3 miles of their mouths, and there is a fresh water lagoon at 2 miles N.E. of Ringaroma river.

WATERHOUSE POINT is the rocky termination of a range of hills descending from the south-westward ; it has a sandy hillock upon it, and a reef of rocks projects one-third of a mile to the northward from the point, with a continuation of the reef bordering the shore for 1½ miles to the south-westward, from which it projects about a quarter of a mile. The land at the back of the point is higher than that of the island bearing the same name, which lies off it, and is composed of grassy woody hills, rising over each other by gentle ascents.

WATERHOUSE ISLE, the north point of which lies N.W. ¾ N. 3 miles from Waterhouse point, is 2½ miles long, N.N.E. and S.S.W. and half a mile broad ; for about a mile from the north point the north-western side of the island is rocky ; but from thence to its west point there are 4 to 15 fathoms at a quarter of a mile from the shore. The south eastern side consists of beaches and rocky points, with the land rising abruptly to a moderate elevation, the level top being mostly covered with wood.

This side of the island is fronted by banks and shoals, having 12 to 15 feet water on them, the northern part of which extends to above a mile S.E. by E. of the north point of the island ; the outer edge from thence trends in and out, southward, to half a mile N.W. of Waterhouse point, and terminates in a narrow bank extending S.W. by W. and W.N.W. 1½ miles, to half a mile East of the south point of Waterhouse isle ; this spit forms the south side of a bight in the shoals, with anchorage in 4 and 5 fathoms. There is a shoal with dry rocks upon it, between half a mile and 1 mile south-eastward of the south point of Waterhouse isle, and a sunken patch lies S.S.W. nearly 1 mile from the point ; between these and the island is a clear channel, with 9 to 7 fathoms, leading to the anchorage in the bight, before mentioned. The channel between Waterhouse point and the shoals to the northward of it, is one to two-thirds of a mile wide, with 4 to 5½ fathoms, and a clear approach from the eastward, with 8 to 5 fathoms water. There are 23 to 8 fathoms in approaching the anchorage from the westward, the only known danger being the sunken patch S.S.W. of Waterhouse isle.

ANCHORAGE.—Captain Stokes says, a vessel in westerly winds, should anchor in 6 fathoms, in line between Waterhouse point and the north

point of Waterhouse isle. And this anchorage being not so far to leeward as those on the western side of Flinders island, is the best place of refuge for strangers arriving in a westerly gale off Port Dalrymple, where, as they can get no assistance from the pilots, they may not like to run in, on account of its treacherous appearance. With easterly winds, a vessel may anchor in 3 or 4 fathoms, in the bight of the shoals, with the two extremes of the island bearing W. by S. and North.

TIDES.—The flood stream sets to the south-westward, and the ebb to the north-eastward, $1\frac{1}{2}$ to 2 knots through the passage between Waterhouse point and isle.

ANDERSON BAY.—From Waterhouse point a mostly rocky coast trends S.W. by W. 4 miles to Croppies point, from which Anderson bay extends S.W. $\frac{3}{4}$ W., $12\frac{1}{2}$ miles to East Double Sandy point; its south-western part forms a bight 6 miles deep, into which flow the Trent and two Forester rivers, from the southward and eastward. The eastern or Great Forester and the Trent, to the westward of it, have one mouth at S.E. $5\frac{1}{2}$ miles from East Double Sandy point, and at S.S.W. 2 miles from the point, is the mouth of the West Forester. These rivers are separated from each other by Granite point. A rock lies $3\frac{1}{2}$ miles south-westward of Croppies point, at 1 mile off shore, and at one-third of a mile off the mouth of the westernmost of the three rivers is Forester rock, both being above water.

DOUBLE SANDY POINTS, which resemble each other, lie E. by N. and W. by S. $2\frac{1}{2}$ miles apart, with a boat-cove between them; they are topped with sand-hillocks almost bare, and the back country appeared sandy and more barren than that in the vicinity of Waterhouse point. At a mile from the eastern point there is no bottom at the depth of 13 fathoms: West Double Sandy point and another projection at $1\frac{1}{2}$ miles to the south-westward of it, have reefs extending from them; outside the former there are 4 and 5 fathoms within 1 mile of the shore; but at N.W. 1 mile from the latter is a reef of dry and covered rocks. Two sunken rocks, the positions of which are marked doubtful in the chart, lie to the northward of the Double Sandy points; one at the distance of a mile from the eastern, and the other at 2 miles from the western point.

NINTH ISLET is small, level, and of green appearance, lying N. by W. $\frac{1}{4}$ W. $6\frac{1}{2}$ miles from West Double Sandy point.

NOLAND BAY.—From the projection $1\frac{1}{2}$ miles south-westward of West Double Sandy point, Noland bay extends W. by S. $\frac{1}{2}$ S. 11 miles to Stony head, and is 3 miles deep. Little and Great Piper rivers flow into the bay, the former at 5 miles south-westward of West Double Sandy point, and the latter at $2\frac{1}{2}$ miles farther to the south-westward; the shore between

the two rivers is rocky. At $3\frac{1}{2}$ and $4\frac{1}{2}$ miles eastward of Stony head are two rocky points with a sandy bay between them, and Tam O'Shanter bay on the west side of the western point, between which and the head the shore is rocky.

STONY HEAD, a conspicuous, but not very prominent projection of the coast, is the extremity of a ridge of hills branching out from the inland mountains, and stretching across the low sandy land in front, to the sea, in lat. $40^{\circ} 58' 45''$ S., long. $147^{\circ} 2' 30''$ E.

TENTH ISLET, N.W. 3 miles from Stony head, is a mere white rock much resembling Ninth islet from a distance, both being rather low, with cliffy faces to the westward, and sloping away in the opposite direction. There is a safe channel between the islet and Stony head, with apparently no other dangers than a reef which surrounds the islet.

DIRECTIONS.—Tenth and Ninth islets are good guides for Waterhouse anchorage; the course and distance from the former are N.E. $\frac{3}{4}$ E. $14\frac{1}{2}$ miles to the latter islet, which should be passed on the north side, and from North islet E. by N. $\frac{1}{4}$ N. 16 miles to the south point of Waterhouse isle. Mount Cameron bearing nearly S.E. by E. $\frac{1}{4}$ E., is a distant mark for making Waterhouse isle from the north-westward.

From a rocky point 1 mile W.S.W. of Stony head, the coast trends S.W. by S. $3\frac{1}{4}$ miles to Currie river, and from thence W. by N. $3\frac{1}{2}$ miles to Five Mile bluff, forming a bay $1\frac{1}{2}$ miles deep mostly bordered by reefs.

LOW HEAD.—From Five mile bluff the coast trends S.W. $\frac{1}{2}$ S. $4\frac{1}{2}$ miles to a bight formed on the south-west side, by a narrow promontory extending N.W. by W. $1\frac{1}{4}$ miles to Low head, the eastern entrance point of Port Dalrymple and Tamar river. A reef lies N.E. $\frac{1}{2}$ E. $1\frac{2}{3}$ miles from Low head, and three-quarters of a mile from the shore, with which the reef is connected by a shoal. Vessels are liable to be set by the ebb stream into the bay between the reef and the head.

LIGHT.—The light-house on Low head, which stands 2 cables' lengths within its extremity, in lat. $41^{\circ} 3' 14''$ S., long. $146^{\circ} 48' 38''$ E., is a tower 36 feet high, its upper part being *red* and the lower part *white*; it exhibits at the height of 142 feet above high water, a light revolving every minute and 40 seconds, visible at the distance of 15 miles: at 10 miles it appears for 50 seconds bright, and 50 seconds dark.

PORT DALRYMPLE and TAMAR RIVER.—Port Dalrymple, the principal harbour on the north coast of Tasmania, forms the entrance of Tamar river, which flows through a valley betwixt two irregular chains of hills, that shoot out north-westward from the great body of inland mountains. In some places, these hills stand wide apart, and the river then opens its banks to a considerable extent; in others, they nearly meet,

and contract it to narrow limits. Of the two chains of hills which bound the valley, the eastern one terminates at Low head; the other descends to Badger point, at S.W. by W. $\frac{1}{4}$ W., $6\frac{1}{2}$ miles from the head.*

The ends of these chains, when seen from directly off the entrance, appear as two clusters of hills having some resemblance to each other; and in fine weather, the distant blue heads of the back mountains will be seen over the tops of both clusters. These appearances, together with the position of the vessel, are the best distant marks for finding Port Dalrymple.

Coming alongshore from the eastward, Ninth islet, and afterward Stony head, with Tenth islet lying off it, will show the vicinity of the port; and Low head, with the conspicuous light-house on it, will be perceived in the bight to the S.S.W. At 10 or 12 miles to the south-westward of the port, the back land is uncommonly high, and the top of the ridge is rugged, forming uncouth shapes. These mountains, with the direction of the coast and the most remarkable of the clusters of hills just noticed, may serve as marks for Port Dalrymple to vessels coming along shore from the westward.

The entrance of Port Dalrymple, between Low head and Friend point, which lies S. by W. $\frac{3}{4}$ W. $1\frac{3}{4}$ miles from the head, is difficult of access, on account of the numerous reefs and banks in it, which extend a considerable distance from the western side of the entrance; strangers should therefore avoid that side, and endeavour to enter by Low head. The greater part of these shoals, and also of those within, are covered at half tide, so that with the flood, or even a little before, is the best time to enter Port Dalrymple, as almost the whole of the dangers are then visible.

HEBE REEF, the outermost danger off the entrance of Port Dalrymple, was so named from a ship which was lost on it in 1808; the reef is about a quarter of a mile in extent, mostly in an East and West direction. A small portion of its centre, which is nearly dry at low water, lies West $2\frac{1}{2}$ miles from Low Head light-house. A bank with 4 to $4\frac{1}{2}$ fathoms water on it, extends half a mile eastward from the reef; but there are 6 and 7 fathoms within a quarter of a mile northward and southward of the reef. As the northern edge of Hebe reef is in line with Flinders and Badger points, bearing S.W., a vessel by keeping Badger point open to seaward of Flinders point, will be outside it.

THE EASTERN SHORE of Port Dalrymple, from Low head, trends $1\frac{1}{2}$ miles in a S.E. $\frac{1}{4}$ S. direction, to the south point of Lagoon bay, and consists of alternate points and small bights, bordered by a shoal, the 3-

* See Plan of Port Dalrymple, and river Tamar to Launceston, No. 1,080; scale, $\frac{1}{2}$ inch.

fathoms edge of which projects 1 to 2 cables' lengths from the shore; the shoal extends as a spit, $1\frac{1}{2}$ cables' lengths north-westward from Low head, and at a quarter of a mile southward of the light-house it projects $1\frac{2}{3}$ cables' lengths south-westward, nearly to the Middle bank.

BARREL ROCK BEACON, which is *red*, stands on a projection of the reef which borders the shore, at S. by E. $\frac{1}{2}$ E. two-thirds of a mile from the light-house; a spit projects one cable's length from the beacon in a S.S.E. direction, towards a patch of kelp, known as the 3-fathoms bank, which extends $1\frac{1}{2}$ to $2\frac{1}{2}$ cables' lengths from the beacon, leaving a narrow channel with $5\frac{1}{2}$ fathoms, between the spit and the bank.

ANCHORAGE.—There are $3\frac{1}{2}$ to 4 fathoms between the 3-fathoms bank and the shore, and anchorage in 4 to 8 fathoms off Lagoon bay, or anywhere between the 3-fathoms bank and the southern point of the bay, with 3 fathoms at 1 to $1\frac{1}{2}$ cables' lengths from the shore.

The **WHITE TOWERS** are two circular stone beacons, built on the southern end of Lagoon beach, bearing nearly S.E. by E. $\frac{1}{2}$ E. distant about three-quarters of a mile from Barrel Rock beacon; they bear W.N.W. and E.S.E. distant about 100 yards from each other, and being elevated 30 feet above the ground, and always kept *white*, they are visible at 7 miles off. These towers have been erected to guide strangers safely into the port, in the event of the weather being too bad for the pilots to venture outside.

MIDDLE GROUND, the most formidable shoal in the entrance of Port Dalrymple, is a rocky patch, between W. by S. and S.W. 4 and $6\frac{1}{2}$ cables' lengths from the light-house, with, according to report, only 9 feet on one spot at low-water, springs, but the least depth found on it by the *Beagle* was 12 feet. The northern extremity of Low head in one with the first black cliffy projection to the eastward of it, or the flag-staff on Low head open to the northward of the light-house, clears the northern edge of it, and its south-west edge is marked by a *black* buoy, bearing S.W. $\frac{1}{2}$ W., distant 6 cables' lengths from the light-house.

EAST CHANNEL, which lies between the Middle Ground and the shoal which borders the west side of Low head, is one-third of a mile wide in the outer part, with, according to the Admiralty plan, $4\frac{1}{2}$ to 6 fathoms water; but the inner part is barely a quarter of that width, with 4 fathoms apparently on a ridge, extending from the south-east extreme of the Middle Ground to the shore. This channel is not safe for a stranger to enter without a pilot.

WEST CHANNEL, the main entrance into Port Dalrymple, is formed by the Middle Ground on the north-eastern, and Yellow reef on the south-western side, and is nearly 2 cables wide, with depths of 22 to 10 fathoms.

YELLOW and WEST REEFS.—Yellow reef is an extensive patch of kelp with a double light-coloured rock, on which the least depth of water is 6 feet ; it is marked by a *white* buoy, bearing S.W. $\frac{1}{4}$ W., distant three-quarters of a mile from the light-house. This rock forms the east extreme of West reef, the northern edge of which extends from the *white* buoy nearly a mile in a West direction. This reef is about one-third of a mile broad, but the only part of it uncovered at high water, is a patch of black rocks near the centre, bearing S.W. $\frac{1}{2}$ W., distant nearly $1\frac{1}{4}$ miles from the light-house.

The SHEARS BEACON, S.W. by W. $\frac{1}{2}$ W., $4\frac{1}{2}$ cables' lengths from the Barrel Rock beacon, stands on the uncovered part of a reef connected with West reef by shoal water, where the greatest depth does not exceed 15 feet ; a spit, with $2\frac{3}{4}$ fathoms on its extremity, projects N. by E. nearly 2 cables' lengths from the beacon.

The SOUTH-WEST SHORE of Port Dalrymple, from Friend point, the south-west entrance point of the port, trends S.E. by E. about three-quarters of a mile to West beacon, at S. $\frac{2}{3}$ E., 150 yards from which is Browne's house, the first within Friend point. From West beacon the shore extends nearly S.E., $1\frac{1}{2}$ miles to the north-west point of Kelsal bay.

This shore is fronted by a bank, which extends about 1 mile northward and north-eastward to West and Shears reefs, with a narrow inlet—about midway between Friend point and the outer edge of the reefs—running into the bank from the westward, and carrying $3\frac{1}{2}$ to 2 fathoms water. Between this inlet and the shore there are numerous patches of reef, dry at low water.

From the spit which projects northward from the Shears beacon, the 3-fathoms edge of the bank extends S.E. $\frac{1}{2}$ S. $1\frac{1}{2}$ miles, and from thence S. $\frac{1}{2}$ E. nearly $1\frac{1}{4}$ miles to the west point of Kelsal bay. There are several knolls on the bank, the two nearest the edge being marked, one by a *white* buoy, and the other by a beacon ; the former bearing S.E. $\frac{1}{2}$ E., distant three-quarters of a mile Shears beacon, and the latter S.E. $\frac{2}{3}$ S., 4 cables' lengths from the buoy. There is good anchorage in 4 or 5 fathoms at about 1 cable's length from the buoy.

The eastern shore of Port Dalrymple from the south point of Lagoon bay, takes a general S.S.E. $\frac{1}{2}$ E. direction, $2\frac{1}{2}$ miles to the south-west point of Georgetown ; the shore curves a little to the eastward, and about midway between the two points, Long Tom point, which is fringed with reefs, projects nearly 2 cables' lengths from the shore. At a quarter of a mile to the northward of Long Tom point stands Cox's house near the shore.

The eastern shore of Port Dalrymple is fronted by a flat, the 3-fathoms edge of which, from half a cable's length off the south point of Lagoon bay, trends irregularly S. by E. two-thirds of a mile to Cox beacon, from which a spit, with 3 feet water on it, extends nearly a quarter of a mile to the north-eastward, forming between it and the shore, a small inlet having $2\frac{1}{2}$ to 4 fathoms round northward of the spit, and 4 to 2 fathoms within it. From Cox beacon, the edge of the east flat, which is slightly curved and steep-to, trends S. by E. $\frac{3}{4}$ E. $1\frac{1}{8}$ miles to the west point of the east flat, marked by a beacon, and from thence E.S.E. half a mile to the south-west point of Georgetown. There are several patches of reef on the flat between the beacon and the town.

BOMRAY ROCK, N.W. 2 cables' lengths from the beacon just noticed, is a sunken danger, marked by a *chequered* buoy; there is a narrow 7-fathoms channel on the east side, but the wider and deeper channel is on the west side of the rock.

GEORGETOWN is situated on the eastern shore, at nearly $3\frac{1}{2}$ miles within Low head; it is built upon a flat forming the north-western side of Georgetown, or York cove, at the western foot of a group of conical hills.


GEORGETOWN COVE and MIDDLE SHOAL.—The cove extends about N.E. by E., 4 cables' lengths along the south-eastern side of the town, and is $1\frac{1}{2}$ cables wide, with 10 to 2 fathoms water. Middle shoal, which lies in the entrance of the cove, is a cluster of rocks 1 cable long, and has a beacon on its south-west end, bearing S.E., distant $1\frac{1}{2}$ cables' lengths from the south-west point of Georgetown. There are 9 to 12 fathoms water between the shoal and the town, and 7 fathoms between the shoal and the south-east entrance point of the cove.

KELSAL BAY and ARTHUR HEAD.—Kelsal bay extends from its north-west point S.E. $\frac{1}{2}$ E. three-quarters of a mile to Arthur head, and is one-third of a mile deep; but all, except a small inlet close to its north-west point, is filled by a shoal flat, which extends about half way across towards Georgetown. The north extreme of this flat forms a spit, with 3 feet water on it, marked by a *chequered* buoy, lying W. $\frac{1}{2}$ N. three-quarters of a mile from the south-west point of Georgetown. Between this spit and the north-west point of the bay is an inlet, 1 cable wide at the entrance, with 10 to 7 fathoms water, from whence, after trending $1\frac{1}{2}$ cables' lengths to the southward, it divides into two branches, the western carrying $3\frac{1}{2}$ and 3 fathoms for about 1 cable's length to the southward, and the eastern channel 5 to 3 and 4 fathoms, double that distance into the flat, in a S.E. by S. direction.

GARDEN ISLE.—From the northern spit of the flat its north-eastern edge trends E.S.E. two-thirds of a mile to the north point of Garden isle,

which is 2 cables long, N.E. and S.W., with a small hillock on its north-east end, close off which there are 22 fathoms water. There is a narrow reef on the edge of the flat between $1\frac{1}{2}$ and 3 cables' lengths north-westward of the island, each end being marked by a beacon. The edge of the flat from Garden isle trends S.W. one-third of a mile to the shore. It was said that a vessel might, on an emergency, run through the channel between Arthur point and Garden isle, at high water, but according to later directions, it is not safe to attempt it, even at high water.

Port Dalrymple channel from the Middle ground to Georgetown is half-a-mile to 1 cable wide between the flats which front the shores; the narrowest part being abreast of Cox beacon. There is a sufficient depth of water for ships of the heaviest draught, in the fairway, where the soundings range from 26 to 5 fathoms, without any other known hidden danger than the Bombay rock.

BEACONS and BUOYS.—The shoals on either side within the entrance of Tamar river are marked with beacons and buoys: the beacons on the western shore are marked thus , and those on the eastern side, as a cross †. Shoals or rocks, marked with *chequered* buoys, may be passed on either side: a *red* or *black* buoy signifies that the danger extends from the eastern shore, and a *white* one that it extends from the western shore.

PILOTS.—By making the proper signal, strangers may always procure pilots off Port Dalrymple, when the weather will admit of their going off; and should the weather be too bad for this purpose, the boat will be lying in mid-channel, with the flag flying. But for the guidance of those who are obliged to run in without a pilot, the following directions and a good look-out may prove sufficient; more especially since the two towers on Lagoon beach have been erected, by keeping which in line, strangers may run in upon one line of bearing with safety, if, on arriving off the port, it should blow too hard for a pilot to get outside. But it is recommended, as a rule, that strangers never attempt the East channel without a pilot, nor either channel after dark, as this port is difficult to enter at night, even to those who are well acquainted with it.

DIRECTIONS.—WEST CHANNEL.—A vessel bound for Port Dalrymple or Tamar river is recommended, especially if a stranger, to use the West, and safer, channel; and having approached within 6 miles of the entrance, should bring the light-house on Low point to bear E. by S. until the two towers on Lagoon beach are plainly visible; then bring them in line E.S.E., and, keeping them so, steer boldly in. When passing Hebe reef take care not to open the inner or south-eastern tower to the right, or southward of the outer tower.

The two towers in line will lead 3 cables' lengths to the north-eastward of Hebe reef, and through the West channel, midway between the *white* buoy of the Yellow reef on the starboard, and the *black* buoy of the Middle ground on the port hand. Having cleared the West channel, proceed under easy sail for good anchorage in 6 or 8 fathoms, abreast of Lagoon beach, taking care to avoid the spit which projects from the Barrel Rock beacon, and, if a vessel of great draught, the 3-fathoms' bank immediately to the southward of it.

To proceed up the port, when between the Shears beacon on the starboard, and the Barrel Rock beacon on the port hand, steer for the *white* buoy beyond, which marks the west side of the channel. From thence keep in the fairway to the southward between the beacons, having the hand-lead quickly going to the depth of 8 or 10 fathoms; although the bottom will not be felt in mid-channel with that length of line. Great attention must also be paid to the tide streams, as they set obliquely across this part of the river; the ebb, for instance, crosses from Kelsal bay to the beacon on the west point of the east flats, and with such strength as to form whirlpools.

For Georgetown.—Pass the Bombay rock, with the *chequered* buoy, on either side, and if bound to Georgetown, round within half a cable's length, the west point of the east flat with the beacon on it, and the south-west point of Georgetown, leaving the Middle shoal in the entrance of Georgetown cove on the starboard hand, and paying particular attention to the setting of the tide streams. Having entered the cove, anchor opposite the wharf, in 5 fathoms, and moor either with half a cable each way, or with a kedge on the shore, or perhaps, with a hawser to the trees.

For Kelsal bay.—If intending to anchor in Kelsal bay, pass on the west side of Bombay rock, and keep near the western shore, in order to avoid the northern spit of the Kelsal bay flat, marked by a *chequered* buoy. After entering the bay a vessel may moor to the trees.

EAST CHANNEL.—Vessels entering Port Dalrymple by the East channel—which should never be attempted at night—are recommended to close the west side of Low head, to avoid the shoals which stretch out at least two-thirds of the way across from the south-western shore of the entrance.

The Shears and West beacons being clearly distinguished, keep the former a little open to the eastward of the latter beacon until the light-house bears East, so as to clear the shoal which projects north-westward from Low head; and then bring the Shears and West beacons in line with Browne's house S. $\frac{3}{4}$ E., which marks being kept in line will lead through the East channel. Continue this course until the two towers on Lagoon

beach are in line, when steer towards them for the anchorage abreast of Lagoon beach. Or, if bound for Georgetown, proceed as directed when entering by the West channel.

TAMAR RIVER.—The eastern shore of Tamar river, between the south-east entrance point of Georgetown cove and Roundabout point, at S. by W. two-thirds of a mile from it, forms an irregular sandy bay, between which and Garden isle the river is one-third of a mile wide, with 11 to 22 fathoms water, affording room for many vessels to anchor; but the bottom is uneven, and the streams are rapid and irregular.

PORPOISE ROCK, which lies 1 cable's length off Roundabout point, has only 4 feet on it at low water; but it has a beacon, and the water is deep close round it.

From Roundabout point the shore trends nearly S.E. three-quarters of a mile to the foot of a hillock, between which and Effingham point, at 3 cables' lengths to the southward of it, is the entrance of Deceitful cove, a shoal creek trending to the northward.

BRYAN BAY.—The western shore from Arthur head, curves nearly S.S.E. half-a-mile to the north-west extreme of Bryan bay, which from thence extends S.E. by S. nearly 1 mile to Anchor point, and is a quarter of a mile deep, with 4 and 5 fathoms close to the shore. There are 24 to 7 fathoms between Roundabout and Anchor points, with anchorage in 4 to 8 fathoms, in Bryan bay, at a quarter of a mile from the shore.

SHAG ROCK, E.S.E. nearly 2 cables' lengths from Anchor point, is just covered at high water; there is deep water close about it, and 19 fathoms between it and the shore: this rock is also beaconsed.

WEST ARM.—ILFRACOMBE.—YORKTOWN.—The entrance of West arm extends from Anchor point S. by E. $\frac{3}{4}$ E. three-quarters of a mile to Inspection head, at Ilfracombe, from whence the arm trends westward and south-westward $2\frac{1}{2}$ miles to the ruins of Yorktown; it is a shoal inlet one-third of a mile wide half way in, above which it expands to two-thirds of a mile in width, and has a small fresh water stream flowing into its western corner.

MIDDLE ARM is about three-quarters of a mile wide, N.W. and S.E., between Inspection and Middle heads, from whence it trends $2\frac{1}{2}$ miles to the southward. There are 10 to 13 fathoms in the entrance, and 3 fathoms at about three-quarters of a mile within it; above which the arm is mostly filled by a shoal flat, branching to the southward and south-eastward.

MIDDLE ISLE.—Between Middle head and a projecting point at N.E. $\frac{1}{4}$ E. 2 miles from it, the southern shore of the river forms a bay three-quarters of a mile deep; but it is filled by a shoal flat, the edge of

which from Middle point, extends N. by W. two-thirds of a mile to a spit, from whence it curves round eastward and northward to Middle isle, at W. by N. half a mile from the north-east point of the bay. There is good anchorage in 7 fathoms, at one-third of a mile to the westward of the island, with soft regular bottom, and out of the strength of the stream, where a vessel not having a pilot, is recommended to anchor before proceeding farther up the river.

THE QUARANTINE GROUND is the bight formed in the northern edge of the shoal flat, just noticed, from its north-west spit to Middle isle, between which there are 7 fathoms, with 4 fathoms close to the edge of the flat.

From Effingham point the northern shore extends E. $\frac{1}{2}$ N. $1\frac{1}{2}$ miles to 3 cables' lengths northward of Middle isle; there are 6 fathoms close to this shore, and 19 to $4\frac{1}{2}$ fathoms in the fairway between it and the Quarantine ground.

LONG REACH.—From the north-east point of the shoal bay, fronted by the Quarantine ground, the south-western shore of Long reach trends E. by S. $1\frac{1}{3}$ miles, and S.E. by E. $1\frac{1}{3}$ miles to point Rapid. A shoal bank about 1 cable broad, extends from Middle isle along this shore to point Rapid, a projection of the bank being marked by a beacon, at E. by N. 3 cables' lengths from the north point of the island; a rocky spit extends 2 cables' lengths from the shore, at half a mile north-westward of point Rapid.

From one-third of a mile N.N.W. of Middle isle the north-eastern shore—where there is copper and iron ore—curves N.E. and E.S.E. 2 miles to a fresh-water stream, close off which there is anchorage in 4 fathoms. From thence the shore extends S.E. $\frac{1}{2}$ E. 2 miles to the entrance of East arm; it is intersected by small creeks, and rises to a range of stony, but well-timbered hills. The depths of water in Long reach are irregular, varying from 9 to 4 and from 15 to 9 fathoms in the fairway; the deepest water being on the north-east side of the reach, as a bank, with $2\frac{1}{2}$ to 3 fathoms on it, extends 3 cables' lengths from the south-west shore for a distance of 2 miles from Middle isle.

EAST ARM is 4 cables wide at its entrance, from whence it runs in East half a mile and S.E. one mile, its eastern corner terminating in Fourteen Mile creek. From 9 fathoms in the entrance, the depths decrease to $1\frac{1}{2}$ fathoms at about one mile within it. There is ironstone along the south-western shore of East arm.

MORIAREG REACH.—From point Rapid the western shore of Moriareg reach trends S.W. by S. one mile to Shark bay, and from thence sweeps round in a S.S.W. direction $1\frac{1}{4}$ miles to Devils Elbow point, close

off which is an islet, with sunken rocks along its south-east side. This shore which is indented by several shoal bights, may be generally approached within a cable's length in 6 to 8 fathoms. There is anchorage in 6 or 7 fathoms, close off Shark bay, and in 8 fathoms, off a similar bight at one-third of a mile north-eastward of Devils Elbow.

SIDMOUTH.—Between Devils Elbow and a projecting part of Sidmouth, at S. by W. one-third of a mile from it, is a bay having 3 to 5 fathoms water, in which there appears to be anchorage, out of the stream.

The eastern shore of Moriareg reach from East arm, trends S.W. one mile to a projecting point, and from thence South half a mile to another point, between which and a projection at S. by W. $\frac{1}{2}$ W. three-quarters of a mile from it, is a bay half a mile deep ; it has a creek in its bight, and is bordered by a flat which extends a quarter of a mile from the shore. At the entrance of this bay is a 2-fathoms bank, one-third of a mile long, N.N.E. and S.S.W., with a beacon on its south-west point. There is a small 2-fathoms patch in the southern part of the bay, at a quarter of a mile to the eastward of the beacon, with 4 fathoms close to the eastward and westward of it, and 5 to 7 fathoms to the northward of the patch, where there is anchorage with soft bottom. The channel between the bank and the western shore is only one cable wide, with 2 to 4 fathoms.

REDWOOD ISLET.—From the south-west point of the bay, just described, the shore trends S.S.W. half a mile to the east point of the north-western entrance of Whirlpool reach. At 3 cables' lengths to the south-westward of the former point lies Redwood islet, between which and the islet off Devils Elbow the channel is only one cable wide ; but there are 12 fathoms water in it.

WHIRLPOOL REACH. — DANGEROUS ROCK. — Whirlpool reach, from its north-west entrance, between Sidmouth and the opposite point, trends S.E. by E. nearly one mile, and is barely 2 cables wide, with irregular depths of 20 to 7 fathoms. Just within its north-west entrance is a dangerous rock ; in attempting to remove which by blasting, only the top was blown off ; so that vessels are now liable to be carried upon it, whereas, when it previously broke the surface, such was not the case. This danger, which is marked by a beacon, has 10 fathoms on its south-west side, but only 3 fathoms on its north-east side.

From a creek on the south-west side of the south-eastern entrance of Whirlpool reach, the south-western shore trends nearly S.E. by E. $1\frac{1}{4}$ miles, and then S.E. by S. $1\frac{1}{3}$ miles, to Supply rivulet. At about half a mile E.S.E. of the creek, and at the same distance N.N.W. of the rivulet, some sunken rocks lie about a cable's length from the shore.

SPRING BAY.—Between the north-eastern point of the south-east entrance of Whirlpool reach and another point at E. by S. $\frac{1}{2}$ S. $1\frac{1}{2}$ miles from it, is a bight $1\frac{1}{2}$ miles deep. At half a mile within the entrance, where the bight is reduced to two-thirds of a mile in width, is a narrow bank half a mile long, E. by S. $\frac{1}{2}$ S. and W. by N. $\frac{1}{2}$ N., with 6 to 9 feet water on it, and marked by a beacon. There is a channel barely one cable wide, between each end of the bank and the shore, that to the westward having 7, and the other 5 fathoms; both of these channels lead into a basin, with 10 to 3 fathoms water in it, between the bank and a shoal flat extending half a mile from the head of the bight. There is anchorage in 5 to 8 fathoms, sand and shells, between the south-east entrance of Whirlpool reach and the bank to the eastward of it.

EXETER. — SWAN POINT. — SUPPLY FLATS.—From 2 cables' lengths south-eastward of Supply rivulet, the river frontage of Exeter trends N.E. $\frac{1}{2}$ N. one mile to the west point of a shallow bight extending E. $\frac{1}{2}$ S. 4 cables' lengths to Swan point, a narrow projection, with a spit stretching out a quarter of a mile to the north-eastward. From the shore between Supply rivulet and Swan spit, Supply flats extend above one mile in a N.W. direction; the outer part, for a distance of half a mile, forming a spit 3 to 2 cables broad, with 12 to 9 feet water on it, and a beacon at 300 yards within its outer extreme. There is a channel 3 to 2 cables wide between the flats and the south-west shore, carrying 8 to 3 fathoms water, to within 4 cables' lengths of the entrance of Supply rivulet. There are 16 to 10 fathoms between Spring bay and the spit of Supply flats.

DORCHESTER. — EGG ISLET.—Between the south-eastern point of Spring bay and another point at E. by S. $1\frac{1}{4}$ miles from it, three shallow indentations of the northern shore form the river frontage of Dorchester. Egg islet, which lies N.W. by N. three-quarters of a mile from Swan point and one cable's length from the most prominent point of Dorchester, is 300 yards long, N.E. and S.W., and has a spit extending 4 cables' lengths to the westward, where it is marked by a beacon. This islet and spit are separated from the shoal which borders the shore by a channel one cable wide, having 9 to 15 feet water.

The fairway between the spit of Supply flats and the point to the northward of it is a quarter of a mile wide, with 9 fathoms water; from thence to abreast of Swan point the channel is about one-third of a mile wide, with 5 to 7 and 14 fathoms water, and in which there is anchorage at about N.N.W. 4 cables' lengths from Swan point.

From the point at one-third of a mile eastward of Egg islet the north-eastern shore curves $1\frac{1}{2}$ miles, in a S.E. by E. $\frac{3}{4}$ E. direction, to a fresh-water inlet, and from thence S.E. three-quarters of a mile to a small stream, the south point of the mouth of which has a ledge of sunken

rocks projecting a quarter of a mile from it. From this point a bay extends S. by W. $\frac{1}{2}$ W. one mile, and is half a mile deep, with a stream flowing into its bight ; but it appears to be inaccessible on account of the shoal flat which fills the bay. From the southern extreme of this bay the Crescent shore extends S.W. by S. nearly $1\frac{1}{2}$ miles to its western point, and is bordered by a shoal 1 to 2 cables broad.

The western shore from Swan point to a projection at S.S.E. one mile from it, forms a bay one-third of a mile deep ; but it is filled by a shoal flat. From the south-eastern point of this bay the shore trends nearly S. by E. $1\frac{1}{2}$ miles, and then sweeps round three-quarters of a mile in a S.S.W. direction, to a small bight, at 300 yards to the southward of which is Stony creek.

The shore from Swan point to Stony creek is fronted by shoals, the northern portion of which, for about three-quarters of a mile south-eastward of Swan point, extends nearly one mile from the land ; but the outer edge from thence gradually closes southward to one cable's length off Stony creek. There are generally 3 to 12 feet water on these shoals : but the northern extreme consists of a bank, the edges of which are marked by four beacons, standing respectively E. $\frac{1}{4}$ S. half a mile ; E. $\frac{3}{4}$ S. two-thirds of a mile ; S.E. by E. $\frac{1}{2}$ E. three-quarters of a mile ; and S.E. half a mile, from Swan point. There is a small inlet between the north-east extreme of this bank and Swan point. The shore is also bordered by an inner bank about $1\frac{1}{2}$ to 3 cables broad, on the outer edge of which are two beacons ; one at S.E. by S. one mile, and the other S.S.E. $\frac{3}{4}$ E. $1\frac{1}{2}$ miles from Swan point.

SWAN BAY.—From Egg islet the channel trends S.E. by E. $\frac{1}{2}$ E. $1\frac{1}{2}$ miles, and is one-third of a mile wide, with 14 to 4 fathoms, between the north-eastern shore and the shoals which extend from Swan point. The river then increases to one mile in width, forming Swan bay, which has 4 to 8 fathoms water, and affords convenient anchorage. After retaining nearly this width for one mile to the southward, the river gradually contracts to one-third of a mile abreast of Stony creek, where there are irregular depths of 16 to 5 fathoms.

MOUNT MACQUARIE. — UPWAY. — SIGNAL STATION.—Mount Macquarie, N.E. by E. $\frac{1}{2}$ E. nearly 3 miles from Swan point, rises from Upway to the height of 1,212 feet, and has a signal station on its summit.

From Stony creek Tamar river sweeps round E.S.E. and eastward $2\frac{3}{4}$ miles to Cimiterie point, and is generally about one-third of a mile across, from shore to shore ; the channel being one-quarter of a mile wide, with 12 to 7 fathoms in the fairway.

From Cimiterie point the south-western shore trends S.E. $2\frac{1}{4}$ miles to the western side of the entrance of Muddy creek, which extends from

thence N.E. by E. nearly half a mile, and is half a mile deep ; but it is filled by a shoal flat. The shore from Muddy creek trends N.E. by E. about three-quarters of a mile to 3 cables' lengths south-eastward of Pedders point. Between Cimitero point and Muddy creek the shore is bordered by a shoal 1 to 2 cables broad, and the range of Stony and Pleasant hills extends from Stony creek along shore to Muddy creek.

NELSON SHOALS.—The shore from a quarter of a mile northward of Cimitero point trends E. by N. 2 miles to a small stream flowing from the eastward, and from thence the shore turns S.S.E. $\frac{1}{2}$ E. $1\frac{1}{4}$ miles to Pedders point. The bight thus formed is filled by the Nelson shoals, which extend so far towards the opposite shore as to contract the river channel to the width of 3 or 4 cables, with 4 to 2 fathoms water. From about $1\frac{1}{4}$ miles south-eastward of Cimitero point the channel round to Pedders point is only 1 to 2 cables wide ; but the depth of water ranges from $2\frac{1}{2}$ to 6 fathoms. The edge of Nelson shoals is beaconsed.

From Pedders point the river takes a semicircular course round by N.E., $2\frac{1}{2}$ miles to Barnards, or Muddy Plains creek, on the eastern side of the river, at E.S.E. $1\frac{1}{2}$ miles from Pedders point. The south-eastern shore of this part of the river is bordered by a shoal 1 to $1\frac{1}{2}$ cables broad ; but the north-eastern, or Crescent shore is steep-to. The channel from Pedders point to Barnards creek is 1 to 2 cables wide, with 3 to 9 fathoms water ; but from the north point of the mouth of the creek a 9-feet spit projects 2 cables' lengths, leaving a channel only one cable wide, with $2\frac{1}{2}$ fathoms water, between it and the western shore. On either side of this part of the river there are hills of no great elevation, between which the land appears low and swampy.

From Barnards creek the river trends S.S.E. three-quarters of a mile, with a width of one-third of a mile, and depths of $2\frac{1}{2}$ to 4 fathoms. From hence the river expands to three-quarters of a mile in width for about $1\frac{1}{4}$ miles in a S.E. by S. direction, when it trends E.S.E. $1\frac{1}{4}$ miles ; its width gradually decreasing from three-quarters of a mile, midway, to 300 yards abreast of the south-eastern of two small jetties, 4 cables' lengths apart, which project from the north-eastern shore.

From a low point at one mile S.S.E. of Barnards creek the north-eastern shore of Tamar river curves S.E. $\frac{1}{2}$ S. $1\frac{1}{4}$ miles to a point projecting 2 cables' lengths from Green hillock. From this point the shore trends nearly S.E. by E. $\frac{1}{2}$ E. a little more than a mile to the south-eastern of the two jetties, just noticed. The south-western shore is low, and from about $1\frac{1}{2}$ miles S. by E. of Barnards creek, curves uniformly $2\frac{1}{2}$ miles in a S.S.E. and easterly direction to abreast of the south-eastern jetty. This broad part of the river, from about one mile southward of Barnards creek to the south-eastern jetty, is mostly filled with shoal flats, through which the river is reduced to a very narrow winding channel,

with so little as 6 feet water in it, passing between Green hillock and Pig islet, at W.N.W. half a mile from it. This islet, which is about 300 yards in extent, is the north-easternmost of two or three small wooded islands, lying westward of Green hillock.

The river channel from nearly one mile southward of Barnards creek, trends S.E. by E. three-quarters of a mile towards Green hillock, and is a quarter of a mile wide, with 9 feet to 3 fathoms water. At half a mile northward of Pig islet this part of the channel is nearly blocked up by a rocky patch, which is marked by a beacon ; the sides of the channel at one cable's length to the north-eastward and south-westward of the rocky patch being also beacons. From a quarter of a mile north-eastward of Pig islet the channel trends southward between the islet and Green hillock, about one mile, or to within a quarter of a mile of the south-western shore, when the channel sweeps round eastward, and then turns south-eastward close to the two jetties. From a quarter of a mile north-eastward of Pig islet to about the same distance southward of the south-eastern jetty the channel varies from 100 to 200 yards in width, with irregular depths of 3 to $1\frac{1}{4}$ and 4 fathoms, and 6 to 9 feet near the jetties. The numerous buoys and beacons which mark the channel will be best understood by reference to the plan.

From a quarter of a mile South of the south-eastern jetty the river trends S.E. $\frac{1}{2}$ E. three-quarters of a mile, S.W. by S. two-thirds of a mile, and S.E. one mile to the junction of the North and South Esk rivers, at Launceston. This channel varies from 1 to 3 cables in width, with 3 fathoms to 6 feet water.

A range of woody hills extends from Muddy creek nearly 6 miles to Launceston. Between these hills and the river the land is low, and to the northward swampy ; but between Green hillock and a lagoon at one mile northward of Launceston, the north-eastern shore is hilly.

DIRECTIONS.—If bound up Tamar river from Georgetown, haul close round Garden islet, to avoid Middle shoal, and having run between Porpoise rock and the western shore, proceed S.E. $\frac{3}{4}$ S., so as to pass midway between Anchor and Effingham points ; and after clearing Shag rock—if not required to anchor in the Quarantine ground—steer for the north point of Middle isle, and from thence north-eastward into Long reach ; and having fully opened its south-eastern trend, steer through it, keeping nearer the north-eastern shore than otherwise, to avoid the shoals and spit which project from the south-western shore. But no prudent stranger would venture to proceed beyond Middle isle without a pilot. The greatest difficulty in navigating the river between Georgetown and Launceston is Whirlpool reach.*

* Sailing Directions for the River Tamar, by Mr. John Welsh.

LAUNCESTON, the second town in Tasmania, is situated at the head of Tamar river, which, following the winding course of the river, is 35 miles from the sea. Large vessels are prevented from approaching close to the town by a bar, upon which there are generally about 14 feet at high water. Vessels of 17 or 18 feet draught can go within half a mile of the town, below the bar.

A STEAM TUG, maintained by the Marine Board, is available for towing vessels, at moderate rates; the signal for the tug is the rendezvous, or chequered flag, hoisted where best seen. When this signal is made by a vessel in the offing, entering the port, the tug, if at Launceston, will be telegraphed for on that vessel's account.

FLOATING DOCK.—There is a floating dock at Launceston, capable of receiving vessels of 500 tons. In Georgetown cove and other places on the banks of the river, vessels of considerable size may be safely placed upon the "*hard*" to be cleaned or examined.

ELECTRIC TELEGRAPH.—There is an electric telegraph from the heads to Launceston, and from thence to Hobart town and the interior.

The PILOTAGE for sailing vessels at the port of Launceston, is 1s. per ton, inward or outward; for steam vessels 8d. per ton each way; no single act of pilotage to exceed 30l. or be less than 5l. Vessels anchoring below Georgetown, charged one-third pilotage; at or above Georgetown, and below Whirlpool reach, one-half pilotage. Vessels arriving and sailing in ballast, or putting in to seek freight, or from stress of weather, and not breaking bulk, are exempt from all port charges, except only those of pilotage, in cases where the services of a pilot have been actually required and received.

TIDES.—It is high water at Georgetown, full and change, at 12h. 5m. Captain Stokes found the rise irregular, the greatest being 10 and the least 4 feet. The highest tide noticed was during the neaps, caused by a strong north-west gale forcing the water into the river. The flood runs 5h. 50m., and the ebb 6h. 25m. with a velocity varying from 2 to 5 knots, according as the river is confined or open. The ebb stream setting round Low head into the bay to the eastward, is apt to drift vessels in that direction. At 3 miles in the offing the flood stream runs W.N.W. 1 to 2 knots.

At Launceston it is high water, full and change, at 3h. 35m.; springs rise 12 feet. During winter, after rains, the stream sets down for days together, at the rate of 1 to 3 knots.

The NORTH COAST from Flinders point curves nearly W. $\frac{3}{4}$ S. 34 miles to Round Hill point, and has 10 to 15 fathoms water within two miles of the shore. There are not many projecting points; but this

coast is intersected by no fewer than six rivers and one creek, all of which, except the creek, are accessible to vessels of 80 to 200 tons. These rivers flow through a hilly country, which is tolerably wooded to the back mountains. Upon this elevated range are many variously-shaped summits ; among which are mount Roland, 4,047 feet high, bearing S.E. $\frac{3}{4}$ S., distant 27 miles, and Black Bluff, 4,381 feet high, S. $\frac{3}{4}$ E. 24 miles, from Round Hill point. But the most worthy of notice of these mountains appears to be Valentine peak, S. by W. $\frac{3}{4}$ W. 21 miles from the point : this peak is a bare mass of granite 4,100 feet high ; and as it glistens in the first beams of the morning sun like an immense spire, it becomes the most remarkable hill feature on the north coast of Tasmania.

The coast between Friend point and Flinders point, which lies W. $\frac{3}{4}$ N. $2\frac{3}{4}$ miles from the former point, forms a bay having three bights, behind the south-easternmost of which is a lagoon of fresh water. The south-eastern, and apparently greater part of the bay is fronted by a continuation of the shoal flat which projects from Friend point, with its 3 fathoms edge extending two-thirds of a mile from the shore. A small bight in the edge of the flat, close to West reef, affords anchorage in 3 to 5 fathoms, sheltered from all winds between W. by S. round by South, to N.E. by E., with the dry part of West reef bearing W. by N., distant half a mile. There are two detached patches on the east side of Flinders point ; one of which, with $2\frac{1}{2}$ fathoms water on it, lies E. $\frac{1}{2}$ S. three-quarters of a mile, and the other, with $3\frac{1}{4}$ fathoms on it, E. $\frac{1}{2}$ N. half a mile, from Flinders point. There is a channel above two-thirds of a mile wide, with 6 to 8 fathoms water, between this bay and Hebe reef.

FLINDERS POINT is a headland projecting two-thirds of a mile from the line of coast, and is nearly half a mile broad : a shoal, with dry and covered rocks on it, extends a quarter of a mile northward from the point.

BADGER POINT and ASBESTOS HILLS.—Badger point, S.W. $3\frac{1}{2}$ miles from Flinders point, and another projection at $1\frac{1}{2}$ miles southward of Badger point, are rocky and form the north-western termination of the Asbestos hills, in which the stone of that name is found ; they rise to the height of 1,240 to 1,350 feet, and in clear weather, are very conspicuous objects to passing vessels. From the south-western of the two points a low shore curves in a S.W. $\frac{1}{2}$ W. direction 4 miles to a spit forming the south-east side of the entrance of Port Sorrell.

PORT SORRELL and RUBICON RIVER.—The north-western entrance head of Port Sorrell, which lies S.W. by W. $\frac{1}{2}$ W. $5\frac{1}{2}$ miles from Badger point, projects above a mile from the line of coast, and is fringed by a reef of rocks. At about a mile to the south-eastward of the head is Carbuncle

islet, which is connected with the shore by the reef, and forms the west point of the entrance over the bar, where there are 6 to 7 feet water : the bar does not shift, and the only unseen danger is a rock on the east side, with an iron beacon upon it. From the bar the channel trends between the shoals, $1\frac{1}{2}$ miles in a S.S.E. direction, with 2 to 5 fathoms, close up to the south-eastern entrance point : above this a very narrow channel turns about $1\frac{1}{4}$ miles southward and eastward into the port, where there are 2 to 4 fathoms water, between the Sisters islet on the west, and a broad, but shallow creek on the east side, trending N.E. by E. nearly 2 miles : the east point of the Sisters islet had a temporary beacon on it.

BURGES.—This township, which is situated on the west side of Port Sorrell, about $2\frac{1}{2}$ miles within the entrance, has an extensive jetty, with tramway and truck, for the purpose of loading vessels.

DIRECTIONS.—Vessels approaching Port Sorrell from the neighbouring Colonies, should make the land a little to the westward of the port, as the wind during nearly nine months of the year, prevails from N.W., West and S.W., and there is almost a constant current setting to the eastward.

To proceed for the fairway, and avoid the beacons on the east side of the entrance, pass near Carbuncle islet, leaving it on the starboard hand ; keep the houses of Burges right ahead, and run between the east point of the Sisters islet and a *black* buoy which lies off it ; after which anchor, in 4 fathoms, off the jetty.

RUBICON RIVER, which flows into Port Sorrell, is navigable for vessels of more than 100 tons for a distance of 7 miles ; but its narrow winding channel requires the aid of an experienced person as a pilot, who may be obtained on the spot.

HEIDELBURGH is a township situated near Green creek, a shipping place at about 8 miles up the river.

Supplies.—The exports of Port Sorrell consist of posts, rails, and paling, besides farm and dairy produce, some of which is shipped at Green cove. There is a shipbuilding yard in Port Sorrell, where vessels have recently been launched equal to any in the Colony for strength, model, and workmanship. The timber at this port is of excellent quality, and vessels may be repaired at the current rates.

TIDES.—It is high water in Port Sorrell, full and change, at 11h. 35m. ; rise, 8 to 9 feet.

From the north-western head of Port Sorrell the coast trends S.W. by W. $7\frac{1}{2}$ miles to the entrance of Port Frederick, and may be approached within a mile in 4 to 7 fathoms, except at about $4\frac{1}{2}$ miles to the westward of Port Sorrell head, where the Horse-shoe reef extends $1\frac{1}{2}$ miles from the shore.

Egg and Wright Islets are two rocks, one on the northern, and the other on the south-west part of Horse-shoe reef, which consists of detached dry and sunken rocks.

PORT FREDERICK and MERSEY RIVER.—Port Frederick is by far the best harbour between Port Dalrymple and Circular head, nearly 70 miles to the westward of that port, and is easy of access to vessels of 300 tons. The river Mersey, which flows into port Frederick, is navigable for about 6 miles up.

The entrance to Port Frederick may be easily known by its western head being high land, covered with foliage, except the extreme point, or bluff, upon which there was, in 1864, a bare pole, to be replaced by a *white* obelisk.

A reef, discernible from the broken water on it, projects a considerable distance from the east side ; and there is a bar across the entrance, consisting of hard shingle, which is not known to shift. The depth of water on the most shallow part of the bar, at low tide, is $6\frac{1}{2}$ feet ; at springs there are sometimes 19 feet water ; and an average depth of 16 or 17 feet on the bar at high water, may be depended upon throughout the year. There is a *white* buoy moored outside the bar.

TORQUAY and FORMBY are two townships situated at the entrance, or what is generally termed the heads, of Port Frederick.

PILOT.—A licensed pilot, who also acts as harbour-master, is stationed at Formby, who boards, outside the *white* buoy, all vessels requiring his services. Strangers should, therefore, anchor outside the bar, when the weather will permit ; or stand off and on, keeping the Union jack flying at the mast-head until boarded. There is good anchorage in 7 fathoms, outside the bar ; but vessels should bring up well under the west head, so as to have sea-room when getting under way, and to avoid the reef which projects from the east side of the entrance.

DIRECTIONS.—Vessels approaching Port Frederick from the eastward, in standing along the coast, must keep a good look-out for Egg and Wright islets, on the dangerous Horse-shoe reef. But, as a general rule, the land should be made a little to the westward of the port to which a vessel is bound in this locality, in consequence of the prevailing westerly winds and easterly current.

Having made the land just to the westward of Port Frederick, and passed Don bluff—which is a cleared piece of land, with dead trees upon it, at about 2 miles to the westward of Port Frederick—round the west head of the entrance of the port, and steer for the opening of Mersey river, leaving the *white* buoy, outside the bar close on the starboard side. Two land beacons will then be seen ahead, one being a tree without branches, painted *white*, and the other a spar with cross cleats, forming steps ; keep these two beacons in line, and proceed inward, leaving the barrel beacon,

which marks the Muscle rock, also on the starboard hand, and anchor off the jetty.

LATROBE.—The townships of Latrobe, Balahoo, and Tarleton are situated at the head of the navigable part of the river. The wharves at Latrobe have tramways and trucks for unloading vessels; and good commodious buildings have been erected for stowing grain and other produce.

Supplies.—Port Frederick possesses many natural facilities for repairing vessels, as they may be laid upon the hard shingle without the least danger, and take advantage of the saw-mills, where every kind of timber, of the best description, may be purchased at a moderate cost, and resident shipwrights may be procured.

The Exports consist of timber of every description, coal from the mines in the vicinity, farm and dairy produce, and fruit.

GOVERNMENT OFFICERS.—Port Frederick is governed by a local Marine Board, the chairman of which is also the shipping-master.

TIDES.—It is high water at Port Frederick, full and change, at 11h. 40m.; rise, 10 to 12 feet.

DON RIVER, $1\frac{1}{2}$ miles to the westward of Port Frederick, is narrow, although quite safe for vessels of 100 to 200 tons, which have kept up a trade with this port for the last 8 years. Don bluff is higher than the west head of Port Frederick, and has cultivated land and dead trees upon it. A reef, which projects a quarter of a mile from the bluff, serves to break off the sea from the immediate entrance.

Although there is no bar at the entrance of Don river, there are only 4 to 5 feet at low water; but at high water, springs, there are 12 to 14 feet. A buoy is moored, with a heavy anchor and chain, to the north-westward of the mouth of the river, and another buoy was being laid down in mid-channel at one cable's length from the immediate entrance. These buoys may be passed on either side, and are fitted with shackles, to enable vessels to warp in or out.

PILOT.—Strangers may be sure of obtaining assistance from the heads of Don river, by sending a boat on shore; or they may procure a pilot at Port Frederick, by standing off that port, with the Union jack flying.

DIRECTIONS.—After making the entrance of Don river, at a little to the westward of it, as directed for the neighbouring ports, stand in for Don bluff, and having passed the buoys on either side, proceed in, leaving a beacon at the end of the western reef, on the starboard hand, and, with the prevailing north-westerly winds, luff up to the jetty, or run the vessel aground upon the bank, which may be done with perfect safety.

Supplies.—Several vessels belong to the proprietors of the coal mines in the vicinity, and there is every facility for repairing vessels in

Don river, there being a "*gridiron*," by means of which the bottoms of vessels of 300 tons may be repaired. There is a steam saw-mill in constant work, with excellent timber of all kinds, fit for shipbuilding ; and resident shipwrights may be engaged at the shortest notice, and on reasonable terms.

Exports.—Piles of the largest dimensions, may be procured, and there is a constant export of timber, both sawn and split ; also coal and farm produce.

TIDES.—It is high water in Don river, full and change, at 11h. 35m. ; rise, 8 to 9 feet.

FORTH RIVER, the mouth of which forms Port Fenton, lies 4 miles to the westward of Don river, and has a bar at the entrance, which until within the last two years, was fordable on foot, at low water. A reef projects from each head, and the entrance is difficult of access, on account of the changing nature of the channel. In 1864, its direction was nearly straight, in and out, with 5 feet at low water ; but it was likely to alter on the subsiding of the river freshes. At N. by W., one mile from the mouth of the river a bank is said to have been recently formed, upon which the sea breaks at low water. Forth river is deep within the bar, and vessels of about 100 tons load afloat, alongside the stores erected on the bank of the river.

PILOT.—Regular traders are assisted from time to time, by marks, or beacons placed on the land to show the channels ; but strangers should hoist a signal for a pilot, especially in rough weather, when the sea breaks across the bar.

DIRECTIONS.—In making the heads of Forth river, keep well to the westward, to counteract the easterly set, and steer for the entrance ; bring mount Roland, a precipitous mountain, 4,047 feet high, at S. by E. 19 miles from the entrance, to bear nearly S. $\frac{3}{4}$ E., and proceed as guided by the marks and beacons.

LEITH and HAMILTON.—The former of these two townships is situated on the eastern side of the river, near the entrance or heads, and the latter on the same side, at about 2 miles distant. The land in this vicinity is of a superior quality.

Supplies.—The exports of Don river consist of posts, rails, paling, and farm produce.

TIDES.—It is high water in Forth river, full and change, at 11h. 30m. ; rise, 10 feet. In this, like the other rivers on this coast, the tide streams are rapid ; and the ebb is accelerated in winter, by the river freshes. This, together with the seldom-failing night calms and early morning land breeze, enables vessels to make a good offing before meeting the sea breeze.

LEVEN RIVER.—The entrance of this river, which lies $3\frac{1}{2}$ miles to the westward of Forth river, is wide and well sheltered from the prevailing westerly winds by reefs of rocks extending three-quarters of a mile from Dial point, the western entrance head, under the lee of which there is good anchorage, outside the bar, in moderate weather. The bar at the entrance of Leven river, which seldom alters, is fordable on foot, at low water.

ULVERSTONE.—This township is situated on the east bank of Leven river, at a short distance within the entrance.

PILOT.—Vessels of 80 to 100 tons frequent Leven river, it being commodious and perfectly safe for vessels of light draught, to go in or out ; but strangers should make a signal for assistance before entering.

DIRECTIONS.—In coming from the eastward, make for a gap in Dial range, on the west side of Leven river, and when off the entrance, steer for Black Jack, a large isolated round rock, having a temporary beacon on it, which is the second beacon observed in standing in. To the eastward of this is Half-tide rock, uncovered at half tide, and will be avoided by keeping Black Jack rock South. Leave Black Jack rock on the star-board hand, and anchor off Macdonald's public-house, which is situated in the township of Ulverstone.

Supplies.—The exports consist of split timber of every sort ; the timber is of good quality, and well adapted for shipbuilding and railway sleepers. Various kinds of farm produce are also exported from Leven river, which, from the fertility of the adjacent land, are likely to increase.

The climate, like that of the other rivers on this coast, is salubrious, and admirably adapted to invalids.

TIDES.—It is high water in Leven river, full and change, at 11h. 45m. ; rise, $9\frac{1}{2}$ feet.

DIAL RANGE is a ridge of mountains 1,590 to 2,100 feet high, on the western side of Leven river, between 4 miles West, and 7 miles S.W. of its mouth, and terminating to the northward, in two headlands bearing N.W. by W. and S.E. by E., distant $2\frac{1}{2}$ miles from each other, the south-eastern projection being Dial point, the western entrance head of Leven river. Both heads are fronted by dry and covered rocks, some of which appear to extend above half a mile from the shore, with 6 and 7 fathoms close outside them. From the north-western of these two headlands the coast trends W. by N. $\frac{1}{4}$ N. $6\frac{1}{2}$ miles to Blyth river.

PENGUIN CREEK.—Between Leven and Blyth rivers, this coast is intersected by Penguin creek, which is merely a boat harbour. Vessels sometimes anchor off the creek to procure split timber ; but have to leave on its coming on to blow from any other quarter but off shore.

BLYTH RIVER is at present only accessible to small vessels, the entrance being very narrow and having a dangerous rock in it; which however, might be removed, as it is composed of flaky rotten-stone. No vessel should attempt to enter this river without the assistance of a person acquainted with it.

Supplies.—Small vessels frequent Blyth river for paling, posts, and rails; and there is a large quantity of good splitting timber in the vicinity, where the land is of excellent quality. A well-constructed bridge over the river, at one mile above the heads, is crossed by the Circular Head road.

DISTRICT BOUNDARY.—Blyth river is the western boundary of the police district of Port Sorrell, and also divides the Customs survey from that of Circular head; the two surveys being under the immediate superintendence of sub-collectors of Customs, which officers are also police magistrates.

ROUND HILL POINT and EMU BAY.—Round Hill point, W. by N. $\frac{1}{2}$ N. $1\frac{3}{4}$ miles from Blythe river, is surmounted by a hill 760 feet high. Between this projection and Blackman point, W. by N. $2\frac{1}{4}$ miles from it, is Emu bay, into which flows the small river of that name; this bay affords a confined anchorage in 4 fathoms, sheltered from westerly winds.

INGLIS RIVER.—From Blackman point, which has a rock close off it, connected by a reef, the coast curves W. by N. $\frac{1}{2}$ N. 7 miles to a sandy projection, between which and Table cape, N.W. $\frac{1}{2}$ N. $3\frac{1}{2}$ miles from it, is a bay with reefs extending above half a mile from its southern shore. At $2\frac{1}{2}$ miles southward of Table head Inglis river flows through the reefs into the bight of the bay. The coast between Blackman point and the bay is bordered by a reef, and is intersected by several streams, of which the largest is Cam river, at $3\frac{3}{4}$ miles westward of Blackman point.

TABLE CAPE is the cliffy extremity of a woody flat-topped piece of land 380 feet high, visible, in clear weather, at the distance of 36 miles from a ship's deck.

From Table cape the coast extends W. $\frac{3}{4}$ N. 7 miles to a low point surmounted by the Sisters, two remarkable round hills 870 feet high. A reef, having a small islet on it, projects N.N.W. nearly one mile from the point; and a detached patch lies E.N.E. about half a mile from the islet. There is a small Boat-harbour at 5 miles westward of Table cape; and on the west side of the Sisters point is a sandy bay, with 2 fathoms water near the shore, and a small stream flowing into it: this bay is apparently protected from the eastward by the reef, with the islet on it, which projects from the point. The shore from the Sisters point to Rocky head, at N.W. $\frac{3}{4}$ W.

5 miles from it, bordered with rocks ; but it may be approached within a mile in 9 and 10 fathoms.

ROCKY HEAD has a high pointed summit, with other peaks in the rear, rising to the height of 1,000 feet. The head is bordered with rocks ; and a rock 2 feet dry at low water, and surrounded by a reef, lies N.E. nearly $1\frac{1}{4}$ miles from the head.

SAWYERS BAY extends from Rocky head W.N.W. 11 miles to Circular head, and is $3\frac{1}{2}$ miles deep, with low sandy shores, except between Detention river, at S.W. by W. 3 miles from Rocky head, and Black river, S. by E. 5 miles from Circular head ; the intermediate shore being rocky, with hills rising behind it. From 19 fathoms at 2 miles northward of Rocky head, there are 16 to 8 fathoms across the bay to about 2 miles south-eastward of Circular head, with 3 fathoms close off the beach, near Detention river, and 3 to 7 fathoms in the bight close to the southward of Circular head.

The **ANCHORAGE** in Sawyers bay is in 5 to 8 fathoms in the bight to the south-eastward of Circular head, where there is perfect shelter from westerly winds.

TIDES. — It is high water at this anchorage, full and change, at 11h. 40m. ; springs rise 9 feet. The north-west stream begins 2 hours before high water.

CIRCULAR HEAD is the east point of a peninsula which projects N. by W. $4\frac{1}{2}$ miles from the coast, and is half a mile to $1\frac{1}{2}$ miles broad : the isthmus which connects this peninsula with the main-land is very low and narrow, with an inlet on either side. The head, which appears from the eastward, like a small flat-topped island, is a singular mass of trappean rock, rising abruptly from the sea to the height of 486 feet, and is visible in clear weather, at the distance of 30 miles from a ship's deck. A slight covering of withered grass, with only some green bushes, gave it a smooth appearance. The head is connected with the peninsula by a narrow neck of lower land.

The rocky North point of the peninsula lies N.W. $\frac{1}{4}$ N. $3\frac{3}{4}$ miles from Circular head, and has a dangerous rocky ledge, just awash, extending E.N.E. three-quarters of a mile from it, on which several vessels have run ; but it may be avoided by keeping the bluff extremity of the head open of an intermediate projection of the land. Shoal water also extends 1 mile north-westward from the North point.

The north-east side of the peninsula is divided into Half-moon bay and a sandy bight to the south-eastward of it, by a rocky projection, with dry rocks close off it, at N.W. by N. $1\frac{1}{2}$ miles from Circular head. There are 12 to 14 fathoms within 2 miles of this side of the peninsula, and

there are 4 to 6 fathoms in the sandy bight on the north side of the head.

HYFIELD, the headquarters of the Tasmanian Agricultural Company, is a straggling village occupying a flat on the Circular Head peninsula; and in the bay on the south side of the head—which is the general anchorage—there is a store with a jetty. The soil on the peninsula is generally of a poor light nature, and not well watered. English grasses have, however, been sown at the establishment with great success; but English fruit trees planted there suffered much from blight, brought by west winds. In the park at Hyfield there were, in a thriving condition, some fallow deer brought from England.

PERKINS ISLE and BAY.—From the south extreme of Circular Head peninsula a low sandy beach trends W. by S. $\frac{1}{4}$ S. 7 miles, where it terminates in a low point, separated by a narrow opening from the south-east point of Perkins isle, which extends from thence N.W. 4 miles, and is $1\frac{3}{4}$ miles broad at the centre. The west side of the peninsula, the sandy beach trending westward from it, and the north-east side of Perkins isle, together, form a bay, which extends from the North point of the peninsula W.S.W. 9 miles to the north-west extreme of Perkins isle, and is $4\frac{1}{2}$ miles deep. There are 8 to 4 fathoms across the entrance of the bay, with regular soundings towards the shore, affording good anchorage.

The south-west extreme of Perkins isle is separated from the mainland by a very narrow opening; this and the other opening between the south-east point of the island and the spit of the sandy beach, communicate with a land-locked sheet of water nearly 5 miles long, East and West, and 2 miles wide, with the Duck river flowing into its south, and a smaller stream into its east corner.

From the south-west extreme of Perkins isle the coast extends 12 miles in an irregular W. by N. direction to the east entrance point of Welcome river. This coast consists of numerous small inlets and points, and is intersected by two streams, one at $5\frac{1}{2}$ miles, and a smaller one at 10 miles from Perkins isle. A small islet lies close off the mouth of each stream, and a third islet lies about half a mile north-eastward of the east entrance point of Welcome river.

ROBBINS PASSAGE, which separates Robbins island, the south-easternmost of the Hunter group, from the mainland, is bounded to the southward by Perkins isle and the coast from thence to Welcome river; and to the northward, by Robbins island. The eastern entrance of the passage, which appears like the mouth of a river, is about one mile wide between the north point of Perkins isle and the south-east extreme of Robbins island, to the northward of it; but there being an islet in the middle of the entrance connected with Perkins isle by a bar, a very

narrow passage only remains between the islet and Robbins island. Small vessels will find good anchorage in the mouth of this opening, sheltered from all winds.

Immediately within its entrance Robbins passage is 4 miles wide, with 5 to 2 fathoms water, from whence it contracts to two-thirds of a mile in width at about 7 miles within the eastern entrance, the channel being apparently blocked up westward, by the banks which extend from both shores, some of which dry at low water. Two small islets, or rocks lie nearly in mid-channel at $4\frac{1}{2}$ miles within the eastern entrance, and at 5 miles farther to the westward there are two others lying close to the south-west extreme of Robbins island. From the western entrance, which is 1 mile wide, a narrow 2-fathoms channel trends to the northward between the west point of Robbins island and Long isle, which lies about 1 mile to the westward of the point; from thence the channel, with 2 to 3 fathoms, continues 3 miles farther in the same direction, through shoals extending from Robbins island to the main-land westward of it.

From Welcome river the general trend of the coast is N.W. 6 miles to Woolnorth point, the north-west extremity of Tasmania. The western side of the mouth of Welcome river forms a projecting point, on the west side of which is a small inlet, with an islet close off it. There are several islets and rocks close to the east side of Woolnorth point, the two largest being Murkay and Harbour islets, the former lying 1 mile to the south-eastward, and the latter close to the north-eastward of the point; besides these an islet lies $1\frac{1}{2}$ miles to the northward of the point, with which it is connected by a reef that extends to within a quarter of a mile of Murkay islet.

WOOLNORTH POINT is rather low and rocky, but the adjacent soil is most productive, although much labour has been necessary to clear it for cultivation. At 3 miles from the extremity of the point is an out-station of the Tasmanian Agricultural Company.

HUNTER GROUP consists of three principal and many small, but equally conspicuous islands extending N.W. $\frac{3}{4}$ W. 29 miles from the south-east extreme of Robbins island to Albatross islet, and N.N.E. $\frac{1}{2}$ E. 18 miles from the north-west point of Tasmania to the north-east extreme of Three Hummock island, and includes Black Pyramid, which bears W. by S. $\frac{3}{4}$ S., distant nearly 21 miles from cape Keraudren, the north point of Hunter island.

ROBBINS ISLAND, the south-easternmost and second in magnitude of Hunter group, and of which the southern side has already been described with Robbins passage, is a sandy island of a somewhat triangular form, with sides 7 to 8 miles long. There are 6 fathoms over a sandy bottom,

at 1 to 2 miles eastward of the south-east point of Robbins island, and 6 fathoms on foul ground, close off Guiton point, a rocky projection at 3 miles north-westward of the south-east point. Guiton point divides the north-east side of the island into two sandy beaches, the north-western, and more extensive of which forms a slight indentation, with 5 and 6 fathoms at 2 to 3 miles off it. Between the north-west end of this beach and the north point of the island are two small inlets. The north-west side of Robbins island is fronted by a shoal, on which a small islet lies near the shore at 2 miles south-westward of the point.

Water may be procured in the neighbourhood of the south-east point of Robbins island ; but the anchorage near it is exposed to all winds between North and East.

WALKER ISLE, when examined by Lieutenant Robbins in 1800, formed part of Robbins island, from which it has since been separated by a narrow opening caused by the encroachment of the sea. Walker isle is 3 miles long, N.N.W. and S.S.E., and 1 mile broad, with rocky shoals extending from its western side and northern end. Between half a mile and $1\frac{1}{2}$ miles N.W. from the north point of the island is a bight having 6 to 8 fathoms water in it, its western side being formed by a narrow 6-foot spit, projecting $1\frac{1}{2}$ miles to the northward, and its east side being formed by the shoal, on which are situated the Petrel islets, extending N.N.E. nearly 2 miles from the north point of Walker isle.

PETREL ISLETS are a cluster of small islets and rocks, the two largest of which lie respectively, North half a mile, and N.N.E. $1\frac{1}{2}$ miles from the north point of Walker isle ; the outer islet being 74 feet high.

A sandy bank lies nearly 3 miles to the westward of Walker island, with apparently an extensive shoal flat about it.

TOMATIN BANK, on which the barque of that name grounded in 1865, and had to throw part of her cargo overboard, is reported by her commander, Mr. Brown, to lie N.E. by E. $\frac{3}{4}$ E. $4\frac{3}{4}$ miles from the north Petrel islet, with the north-east point of Three Hummock island bearing N.W. by N., distant 9 miles. The chart shows 10 to 12 fathoms water close to the eastward of this danger.

THREE HUMMOCK ISLAND, of which the south point bears N.N.W. $\frac{1}{4}$ W., distant 6 miles from the north point of Walker isle, is the north-easternmost and third island in magnitude of the Hunter group, it being 6 miles long, N.N.E. and S.S.W., and nearly 5 miles broad. It is of an oval form, with a bay on its north-west side and a coast ridge of moderately elevated land, partly bare of vegetation, extending from the south to the north-east point of the island. Three hills, from which the island derives its name, rise gradually from this ridge, the southernmost

being a conical peak at 1 mile north-eastward of the south point, rising to the height of 790 feet above the sea, and is the most elevated part of the island, it being visible in clear weather, at the distance of 30 miles from a ship's deck.

The northernmost hill, at 1 mile south-westward of the north-east point of the island, is 590 feet above the sea, and is visible in clear weather, at the distance of 27 miles from a ship's deck. At $1\frac{1}{2}$ miles to the southward of this is the third, and intermediate hummock.

Between the south and north-east points of Three Hummocks island its coast consists of sandy bays and rocky points. H.M.S. *Norfolk* anchored in $3\frac{3}{4}$ fathoms, in a small sandy bight of the east coast of the island at the foot of the northernmost of the three hills, and found shelter from North round by West, to S.S.E. There are 8 and 9 fathoms at a little more than a mile off this coast of the island; but breakers project nearly half a mile from the points. According to the fifth edition of this work, the depth of water off the south extreme of the island is very irregular, varying from 19 to 6 fathoms at 1 mile from the shore, and shoaling to 2 fathoms at $3\frac{1}{2}$ fathoms in a S.S.W. direction.

MERMAID ROCK is a small sunken danger lying N.W. half a mile from the north-east point of Three Hummock island and nearly North from the northernmost hill; there is deep water close to the rock, and there is a passage a little more than 1 cable wide, between it and the shore, through which H. M. cutter *Mermaid* passed.

From the north-east point of Three Hummock island its rocky coast trends West $3\frac{1}{2}$ miles to the north-west point, and from thence S.W. 1 mile to the north-east point of the bay before mentioned, which extends $2\frac{1}{2}$ miles from N.E. by N. to S.W. by S., and is 1 mile deep, with a shoal in the entrance, between which and the points of the bay there are 5 to 7 fathoms water. At a short distance behind the beach is a small lagoon of fresh water. A projection at three-quarters of a mile to the southward of the south-western point of this bay forms the south-west extreme of the island, which, although rocky, may be rounded within half a mile, in 11 to 7 fathoms water.

ANCHORAGE.—A bay extends S.E. $1\frac{1}{2}$ miles from the south-west extreme of Three Hummock island, and is nearly half a mile deep, with $4\frac{1}{2}$ fathoms water in its centre, where there is good anchorage, sheltered from the westward by Hunter island, and from the southward by the shoals which extend from Walker isle and the sandy banks to the westward of it. From the south-east point of this bay the coast trends E.S.E. 2 miles to the south point of the island, close off which is a dry rock.

Water is plentiful on Three Hummock island, the *Beagle* having been supplied from wells dug on the north point of a sandy bay on the south-

east side. The island is covered with an impervious scrub, the trees being small and stunted.

There is a passage 4 miles wide, between the south point of Three Hummock island and the Petrel islets, but the chart shows only one line of soundings across the channel, in 12 to 14 fathoms, which extends from $1\frac{1}{2}$ miles north-eastward of the northern Petrel islet to the south point of Three Hummock island.

HUNTER ISLAND, the westernmost and largest of the Hunter group, and formerly known as Barren island, is $12\frac{1}{2}$ miles long, North and South, and in form somewhat resembles a closed hand, with the forefinger extending North, and the closed fingers facing West, at the middle and broadest part of the island, where it is 4 miles across, with a small rocky bight on the west side. The southern part of Hunter island is 2 miles broad, but the northern part, from $1\frac{1}{2}$ miles in breadth near the middle, narrows gradually, for a distance of 6 miles to cape Keraudren, the north point of the island. It is moderately elevated, the highest parts being a hill 300 feet high on the east side of the middle of the island, and another 292 feet high, at $3\frac{1}{2}$ miles from the north point. Its northern part has a most barren and sterile appearance, but its southern coasts are formed by wooded hills of moderate height.

The east side of Hunter island is nearly straight, North and South, and has small sandy bays between its slightly projecting points, off which there is good anchorage in less than 20 fathoms, with shelter from all but easterly winds. There are 10 and 12 fathoms water close to the south point of the island; but a bank, with 2 to $3\frac{1}{2}$ fathoms on it, borders the east side between 2 and $5\frac{1}{2}$ miles from the south point, with its northern end extending $1\frac{1}{2}$ miles from the shore. From the north extreme of this bank to the north point of the island, there are 12 to 7 fathoms within half a mile of the shore.

STACK ISLET, about 1 mile to the eastward of the south point of Hunter island, is small, rocky, and destitute of vegetation: it is 140 feet high, with rocks and shoals projecting about a quarter of a mile from its north-east and south-west extremes. There were 22 fathoms, gravel, at a quarter of a mile, and 18 fathoms at $1\frac{1}{2}$ miles, from the south side of the islet, with quickly-decreasing depths south-eastward, in the direction of the banks which extend from the main-land.

PENGUIN ISLET, N.N.E. $\frac{1}{2}$ E. $2\frac{1}{2}$ miles from Stack islet, is also small and rocky, and is situated on the north-western edge of the shoal water, which appears to extend from Walker isle. There is a narrow channel, with 6 to 7 fathoms water, between Penguin islet and the south-east extreme of Hunter island.

The channel between Hunter and Three Hummock islands is 2 to 3 miles wide, with 7 to 17 fathoms water, and apparently no other hidden dangers than the rocks which closely border the west point of Three Hummock island.

ANCHORAGE.—The best anchorage for large ships on the east side of Hunter island is said to be in 14 fathoms, with the island bearing from N.W. by N. to S. by W. distant nearly 2 miles, and the west point of Three Hummock island North about the same distance. The approach to this anchorage between these two islands, is said to be safe under the guidance of the lead, taking care to avoid the Mermaid rock, off the north side of Three Hummock island.

TIDES.—It is high water at the anchorage, on the east side of Hunter island, full and change, at 11 h. 30 m., rise 8 feet. The western stream begins $3\frac{1}{2}$ hours before high water.

The southern end and west side of Hunter island are rocky, and as dangerous rocks and breakers extend considerably to seaward from the north-west point of the island, it should be carefully avoided.

CUVIER BAY, which extends N.N.E. $\frac{1}{4}$ E. 6 miles from the north-west point of Hunter island to cape Keraudren, the north point, is $1\frac{3}{4}$ miles deep in its southern part. As this bay is entirely exposed to westerly winds, it cannot afford very desirable anchorage; the ground, however, is clean, the bottom being everywhere sand, and the depth variable between 8 and 12 fathoms. The coast is steep, and may be closely approached, except near the northern part.

CAPE KERAUDREN is a low sloping rocky point with 23 to 24 fathoms within half a mile of it. A dangerous reef, upon which the sea breaks violently, lies W. by S. $\frac{1}{2}$ S. between $1\frac{1}{2}$ and 2 miles from the cape; there is, however, said to be a good passage between the reef and Hunter island.

NO PASSAGE.—TIDE STREAMS.—There is no passage between Hunter island and the north-west extreme of Tasmania, owing to the numerous islets and reefs with which this space is studded; no vessel should therefore be induced to approach it. The tide streams to the westward of these islets and reefs run at the rate of 2 knots, flowing to the N.E.

TREFOIL ISLET, W. by N. 2 miles from Woolnorth point, is nearly 1 mile in extent, and receives its name from its resemblance to a clover leaf; reefs extend from its north-west and south-east extremes.

BIRD, or LONG ISLET, N.E. $\frac{1}{2}$ N. $2\frac{1}{4}$ miles from Trefoil islet, is 1 mile long, North and South, and nearly connected by rocks and reefs with the south-west extreme of Hunter island. There are 6 fathoms water at 1 mile

to the eastward of Bird islet, and from 6 to 9 fathoms on the east side of some rocks which extend between it and Woolnorth point.

STEEP ISLET, N.W. $\frac{1}{2}$ N. 3 miles from Bird islet, is about half a mile in diameter, and, as its name implies, has a margin of steep cliffs, from which the islet rises to the height of 250 feet. There is a space of nearly $1\frac{1}{2}$ miles between Steep islet and Hunter island; but it is so much occupied by small, though conspicuous rocks, that it cannot be safely used by ships. There are also numerous dry and sunken rocks between this and Trefoil islet, preventing any safe passage that way.

SOUTH BLACK ROCK, W. $\frac{1}{2}$ S. nearly 4 miles from Steep islet, is a high round mass 130 feet above the sea, with a reef extending from its south side, close to the southward of which there are 23 to 36 fathoms water; and there are 19 fathoms between this rock and Steep islet.

NORTH BLACK ROCK, which is much smaller than the South Black rock, lies N. by E. $\frac{1}{4}$ E. $5\frac{1}{2}$ miles from it, and W. $\frac{1}{4}$ S. 3 miles from the north-west point of Hunter island.

ALBATROSS ISLET, the north-westernmost of the Hunter group, and which lies W. $\frac{1}{2}$ N. 6 miles from cape Keraudren, the north point of Hunter island, is three-quarters of a mile long, North and South, a quarter of a mile broad, and rises to the height of 125 feet, it being visible in clear weather, at a distance of 16 miles from a ship's deck. Its shores are mostly steep cliffs, and it is rocky and straggling at the extremities, with breakers lying a little way out from them; when seen from S.W. by W. or N.E. by E. a deep notch in the middle of the island, appears to divide it.

The **SOUNDINGS** are no indication of a vessel's approach to Albatross isle, there being 25 to 34 fathoms within $1\frac{1}{2}$ miles of its west side, and 31 fathoms at three-quarters of a mile from its north end, over a coarse ground with sand and shells. These depths correspond so nearly with what will be found towards King island and for several miles to the westward of it, that in the night, or in thick weather, it ought to be approached with caution.

BLACK PYRAMID, S.W. by W. $\frac{1}{4}$ W. $15\frac{1}{2}$ miles from Albatross islet, is the most prominent of the islets extending westward from Hunter island, and is the first that will be seen by a vessel approaching the Hunter group from the westward. Black Pyramid is a small dark-looking islet, with a round summit, 240 feet above the sea. It appears bold to approach, there being 24 and 25 fathoms within a mile southward, eastward, and northward of it.

CHANNEL BETWEEN the NORTH-WEST EXTREMITY of TASMANIA and KING ISLAND.—This channel, although it is 38 miles

wide, between Hunter and King islands, and the positions of the islets in it are correctly known, is very little used by vessels going through Bass strait, as they generally prefer the Safest entrance, between King island and cape Otway.

REID ROCKS.—The north-westernmost and highest of these rocks, which lie in the north-western part of this channel, is a small dark mass 25 feet above the sea; it bears E. by S. $\frac{1}{2}$ S., distant 12 miles from Stokes point, the south extreme of King island, and has a sunken rock at E.S.E. a quarter of a mile from it. The other two patches of this cluster lie, respectively, E. by S. $1\frac{1}{2}$ miles, and S. by E. $1\frac{3}{4}$ miles from the north-westernmost rock, and the latter patch has a rock above water on it. There are 28 fathoms at 5 miles north-eastward of Reid rocks, and 35 fathoms between 4 miles to the south-eastward and south-westward of them, showing that the lead is no certain guide for approaching these dangers at night or in thick weather, and as the tide streams here run with rapidity, a vessel should avoid them at such times, unless her position has previously been well ascertained by a sight of the land on either side.

BELL REEF, bearing S. by W. $\frac{1}{4}$ W., distant $9\frac{1}{2}$ miles from the north-westernmost Reid rock, and S.E. $\frac{3}{4}$ S. 16 miles from Stokes point, is about $1\frac{1}{4}$ miles long, N. by W. and S. by E., and a quarter of a mile broad, with 33 fathoms at E.S.E. 1 mile from its south extreme, and 36 fathoms, sand and shells, midway between it and Reid rocks. This reef lies much in the way of vessels using the passage southward of King island, and is the more to be avoided as the sea was only seen to break at intervals on it, even with a heavy swell.

CLEARING MARKS.—In proceeding eastward or westward, Black Pyramid being kept on an East bearing, will lead $2\frac{1}{2}$ miles southward of Bell reef: and in going northward or southward, the north-westernmost Reid rock being kept on a North bearing, will lead 2 miles eastward of the reef.

SOUNDINGS.—There is no bottom in 220 fathoms, at 47 miles S.W. $\frac{1}{2}$ S. of Black Pyramid; but at 35 miles from it in the same direction, there are 70 fathoms, sand and shells, with regular soundings in 44 to 35 fathoms, between that depth and the Pyramid. In the channel between the Hunter group and King island, the soundings generally range from about 24 to 36 fathoms, the deepest water being 44 fathoms, at about 6 miles to the westward of Albatross islet.

DIRECTIONS.—The channel between the Hunter Group and King island, as before stated, is not recommended; and as there is a possibility of dangers still lying undiscovered, between King island and the north-west

extremity of Tasmania, the Safest passage between, King island and cape Otway, should be preferred. But should a vessel be in such a position as to make it desirable to enter Bass strait by this channel, she should keep well to the southward of Bell reef, and pass close to the Black Pyramid, which, as before noticed, being brought to bear East, would lead about $3\frac{1}{2}$ miles to the southward of this reef. Or, with a commanding breeze, a vessel may pass between King island and Reid rocks, without danger, by keeping well over on the north-western side, and paying attention to the tide stream, which sets across the channel, occasionally with some strength.

The TIDE STREAMS set through mid-channel between King island and Hunter group from 1 to 3 knots, the flood to the north-eastward, and the ebb to the south-westward.

THE WEST COAST OF TASMANIA.

The west coast of Tasmania is generally a rocky shore, of sterile aspect, with reefs fronting it to the distance of 3 or 4 miles in some places, and a heavy swell usually rolling in upon it from the S.W. The prevailing winds are from the same quarter, and bring much bad weather, especially in the winter months of June, July, and August. An experienced resident in that country has observed :—"Whenever the wind veers round to the S.E., or is easterly, it is certain intimation of fine weather ; but whenever the wind shifts against the sun, bad weather is sure to follow. Mariners sailing along the coast will, therefore, do well to pay attention to the state of the wind, which affords almost infallible prognostics of good or bad weather."*

CAPE GRIM, the north-west cape of Tasmania, is a steep black head, close off which are the high conical Doughboy and Steeple rocks, nearly of the same description as the cape. The coast between Woolnorth point, the north-west extremity of Tasmania, and cape Grim consists of a sandy beach and a rocky point, fronted by dry and covered rocks.

At S.S.W. 4 miles from the high conical rocks which lie close to cape Grim, and at three miles from the cliffy shore abreast, there are 120 fathoms, on a sandy bottom. A shore so steep should therefore be avoided in the night, or in thick weather, especially with the wind blowing from the westward.

TIDES.—It is high water at cape Grim, full and change, at 10h. 30m.; the south-west stream begins at $3\frac{1}{4}$ hours before high water, flowing at springs, with a velocity of 5 knots, and at neaps, 3 knots.

* Mr. G. W. Evans, Surveyor-General in Van Diemen Land, in his Geographical, Historical, and Topographical Description of it, p. 51

STUDLAND BAY.—To the southward of cape Grim, black cliffs extend nearly 5 miles to the northern Bluff point, on the east side of which is Studland bay, a small exposed sandy bight with an islet in it.

BOAT HARBOUR.—From Studland bay the coast trends S. by E. $\frac{1}{2}$ E. $4\frac{1}{2}$ miles and S. by W. $5\frac{1}{2}$ miles to the northern Boat harbour, from the bight of which Green point stretches out nearly $1\frac{1}{2}$ miles to the north-westward. There is a rock close off Green point, and a reef lies nearly one mile to the south-westward of it. Within the reef is a small bay, from the inner part of which the coast trends S.W. $\frac{1}{2}$ W. $2\frac{1}{2}$ miles to West point.

WEST POINT, so named from its being the westernmost point of Tasmania, is a sandy projection, enclosed by dry and covered rocks, in lat. $40^{\circ} 57' S.$, long. $144^{\circ} 38' E.$ M. Freycinet could find no bottom with 53 fathoms of line, at 6 miles off the point.

Between West point and the southern Bluff point, which lies S. by E. $\frac{1}{2}$ E. $3\frac{1}{2}$ miles from it, is a bight with an islet near its south-eastern shore, and at $1\frac{1}{2}$ miles south-eastward of the latter point is a small opening, close off the entrance of which is Church rock. From Church rock the coast trends S.E. by E. $\frac{1}{2}$ E. 4 miles to Arthur river.

ARTHUR RIVER is about half a mile wide at the mouth, and at 17 miles above it, in a S.E. direction, it is joined by Hellyer river, a small stream which rises near Valentine peak.

SOUTHERN BOAT HARBOUR.—From the mouth of Arthur river the general trend of the coast is S. $\frac{1}{2}$ E. 12 miles to Ordnance point, the Southern boat harbour being an inlet, with a narrow entrance, at 7 miles to the southward of the river. Both entrance points of the harbour are fronted by rocks; and Ordnance point has dry and covered rocks lying about $1\frac{1}{2}$ miles off it.

SANDY CAPE, S. by E. $\frac{1}{2}$ E. 11 miles from Ordnance point, projects 2 miles from the line of coast; the cape and the exposed bight between it and Ordnance point, are bordered by reefs of dry and covered rocks. Between the Southern boat harbour and Sandy cape there 44 to 26 and 45 fathoms at 4 to 7 miles from the shore, with irregular depths of 35 to 10 fathoms between the former soundings and the reefs.

Between Sandy cape and another projection S.E. $\frac{3}{4}$ S. 13 miles from it, the coast forms an exposed bight, having an inlet at about 7 miles south-eastward of the cape. From the south-east point of the bight the coast trends S.E. by E. $\frac{1}{2}$ E. 5 miles to the entrance of Pieman river, at 2 miles to the north-westward of which is a small inlet or creek. There is a patch of dry and covered rocks close off the mouth of Pieman river, and at 2 miles to the southward of it are the Two Conical rocks, standing on a reef of dry and covered rocks, extending along a projecting part of the coast.

From the Two Conical rocks the coast takes a S.S.E. $\frac{3}{4}$ E. direction 13 miles to a point, at one mile within which is a small stream, from whence Long Sandy beach curves south-eastward and southward 20 miles to the entrance of Macquarie harbour; at 8 and 14 miles to the northward of which the beach is intersected by two small streams. There are 12 and 13 fathoms at $1\frac{1}{2}$ miles, and 28 to 20 fathoms between 5 and 4 miles from the beach.

MOUNT NORFOLK.—From West point to about 60 miles southward of it the country is low for 2 or 3 miles inland, it then rises gently to low barren hills, behind which there is a second chain much higher and better wooded than the first. Mount Norfolk, East 10 miles from Sandy cape, is the northern and more elevated of two hills near each other, on the north end of this chain, which are conspicuous from the offing, and in clear weather, are visible before the coast abreast of them.

MOUNT HEEMSKERK and ELDON RANGE.—Mount Heemskerk, N.E. by N. 4 miles from the north end of the Long Sandy beach, is the western summit of a ridge extending from thence nearly E. $\frac{1}{2}$ S. 26 miles to Eldon range; the former is visible at the distance of above 30 miles, and the latter is 4,739 feet high.

SOUNDINGS.—From 35 fathoms, rock, at 17 miles westward of Sandy cape the soundings increase to 106 fathoms, fine white sand and shells, at about 30 miles westward of mount Heemskerk, at 5 miles outside which the depth decreases to 66 fathoms, rock. At about S.W. by W. 27 miles from mount Heemskerk there is no bottom at 120 fathoms, the intermediate soundings being 95 and 91 fathoms; and there are 85 to 91 fathoms between 11 and 17 miles from Long Sandy beach.

CAPE SORELL, in lat. $42^{\circ} 11' 30''$ S., long. $145^{\circ} 10'$ E., is a rocky projection of moderate height, forming between it and the north end of the Long Sandy beach an extensive bay, in the southern part of which is the entrance of Macquarie harbour; cape Sorell being the western head of the entrance.

The extremity is low, terminating in straggling bare rocks of brown appearance, and the coast on each side is very rocky and sterile. Many patches of breakers and rocks above water lie detached from the shore; and there is one small rock just above the water's surface, lying N.W. 2 cables' lengths from the cape, with apparently no safe channel in-shore of it.*

WATTS HILL, E. $\frac{1}{4}$ N. $1\frac{1}{2}$ miles from cape Sorell, is a conspicuous lump of rock on the north-eastern part of the cape; a rock above water connected with the shore by a reef, lies N.W. $1\frac{1}{2}$ cables' lengths from the foot of the hill. There is a small rocky islet at E. $\frac{3}{4}$ N. from the hill and about 100 yards from the shore, the least depth of water between them

* See Plan of Macquarie harbour, No. 1629; scale, m = 1 inch.

being 3 fathoms on a sandy bottom, with somewhat less close to the southward of the islet, in a small bight formed in the northern edge of the shoal which extends from the shore. This small nook, although scarcely an eighth of a mile across in any direction, would nevertheless afford shelter in very smooth water, to any vessel which might be caught suddenly by a northwester in the Outer road, and be unable to cross over the bar of Macquarie harbour.

MACQUARIE HARBOUR is an extensive sheet of water, trending from its entrance S.E. by E. 17 miles, and which is 2 to 4 miles wide, with regular soundings within the entrance, ranging from 5 to 20 fathoms; but the entrance, which is very narrow, is obstructed by a 9-foot bar between the Outer and Inner roads. And it must be borne in mind that the channels are liable to alter in position and depth, owing to the occasional great rush of water out through the banks and shoals, which, being composed of sand, are of a shifting nature.

FRENCKMANS CAP, which bears East, distant 30 miles from cape Sorrel, and is in lat. $42^{\circ} 16'$ S., long. $145^{\circ} 50'$ E., being 4,756 feet high, would probably serve in clear weather, to point out the entrance of the harbour.

PILOT BAY extends from the foot of Watts hill S.E. $\frac{1}{2}$ E. about 1 mile to the western entrance point of Macquarie harbour, and has a sandy beach, in the western bight of which, behind some dry and covered rocks, is a small run of fresh water flowing from the swampy land behind it; but this bay is only accessible to boats, on account of its being filled by the western sands of the bar, there being only $4\frac{1}{2}$ feet water on their outer spit, at two-thirds of a mile to the eastward of Watts hill. The pilot station at Macquarie harbour was abolished above 30 years ago.

MOUNT ANTHELL, S.S.E. about 1 mile from Watts hill, is similar to it, but has a remarkable double summit; it is situated about half a mile to the southward of the beach of Pilot bay, and is little more than half that distance from the sea to the westward; there is abundance of water near the mount.

ENTRANCE ISLET lies about 100 yards to the eastward of the steep rocky projection which forms the south-eastern point of Pilot bay and the west entrance point of Macquarie harbour. The islet is little else than a mass of rock, having some small detached rocks close about it, except apparently, on its eastern side. The proper channel into Macquarie harbour is between this islet and the western entrance point, where there are 7 to 11 fathoms close to the rocks.

SANDY POINT.—From one-third of a mile eastward of Entrance islet the sandy beach which forms the eastern side of the entrance to

Macquarie harbour trends S. by E. half a mile to Sandy point, on each side of which the land is low and sandy for several miles, and is covered with shrubs ; the land which forms the western side of the channel is steep, and rises to several ranges of irregular rocky hills, amongst which are several masses of quartz, or other white stone, which gave them the appearance of being partially covered with snow.*

The western side of Sandy point is fronted by a bank, the outer edge of which extends from the point to Entrance islet, and from thence N.N.W. half a mile to a 6-feet spit, forming the eastern part of the bar. From this spit the north-eastern edge of this bank trends S.E. by E. to within a quarter of a mile of the beach. There is said to be a very narrow channel, with 10 to 12 feet water, close to the eastern side of Entrance islet.

THE BAR, which has only 9 feet on its deepest part at low water, lies nearly three-quarters of a mile outside Entrance islet, and separates the Outer from the Inner road. The soundings outside the bar, from 14 fathoms at 2 miles N.N.E. of cape Sorell, decrease irregularly to 9 feet on the bar. At a quarter of a mile within the shoalest part of the bar the channel is a quarter of a mile wide, with 2 to 3 fathoms water, from whence it narrows towards Entrance islet, and the depth increases to 5 and 6 fathoms.

MOUNT WELLINGTON.—From the western entrance point the shore trends S.E. by S. nearly $1\frac{1}{4}$ miles to the steep south-eastern foot of mount Wellington, a conspicuous hill, bearing South, distant half a mile from Sandy point. This mount rises rather abruptly from the shore on the west side of the harbour, and will be easily distinguished by its table top, which is elevated 260 feet above the level of the sea, and is separated from the other hills to the westward by a deep notch, that gives it the appearance of being insulated, before the connecting land becomes visible. There is a white mark about half way up the hills on the south side of the mount.

BUSBY ISLET, which lies close to the shore, at one-third of a mile to the northward of mount Wellington, is small with a round bushy summit,

* To the same cause may, perhaps, be attributed similar appearances of snow, which many navigators have observed on the inland and more elevated ranges of hills, while the temperature at the level of the sea has not tended to confirm so plausible a supposition. H.M. sloop *Bathurst*, homeward bound from Port Jackson, passed round the south coast of Tasmania in October 1822, at which time all the elevated parts appeared to be partially covered with snow near their summits, although Fahrenheit's thermometer on board, was 56° and 57° in the shade, and did not fall below 54° when exposed to a fresh N.E. wind blowing off the shore. Many of the highest mountains on this land, including those on the east side of Macquarie harbour, which are elevated 3,500 feet above the level of the sea, are said by the colonists, to be covered with snow during great part of the year.

and two dry rocks lying a full cable's length to the southward of it. There is a very narrow 13-foot channel between this little cluster and the western shore, by keeping the former aboard; as also between it and a small sandy bight at the foot of mount Wellington; but the latter should not be used when it is practicable to pass eastward of Bushy islet.

From Entrance islet to Bushy islet the channel is $1\frac{1}{2}$ to 2 cables wide, with 9 to 4 fathoms water; but from Bushy islet to the foot of mount Wellington, between which and the edge of the eastern shoals the channel is only 2 cables wide, the depth of water varies from $2\frac{1}{4}$ to $4\frac{1}{2}$ fathoms.

CHANNEL BAY extends from the foot of mount Wellington S.E. $\frac{1}{2}$ S. nearly 1 mile to Round head, and is half a mile deep; a shoal, with 6 to $1\frac{1}{2}$ feet water on it in the middle of the bay, divides the channel into two passages; the inshore passage, which follows the curve of the bay between the bank and the shore, is about 1 cable wide, with 2 to 5 fathoms water. The middle passage between the bank and the extensive sand-banks which stretch out from the northern shore, is also about 1 cable wide, but has only 9 to 12 feet water.

MUSQUITO COVE is a very small sandy bight on the south side of mount Wellington, with a run of fresh water, and good anchorage in 12 to 20 feet water, on a sandy bottom, within 40 or 50 yards of the beach.

The NORTHERN SHORE from Sandy point trends E. by N. $1\frac{1}{4}$ miles, and then sweeps round in a S.E. by E. and N.E. by E. direction $1\frac{3}{4}$ miles to River point, and is fronted by extensive sand-banks, nearly dry at low water, which form the eastern and northern sides of the channel leading into Macquarie harbour.

The outer edge of these northern extensive sand-banks from Sandy point trends S.S.E. half a mile, and then projects into Channel bay, contracting the channel to a width of 150 yards, but with depths of 7 and 8 fathoms. From 2 cables' lengths S.S.E. of mount Wellington the edge of the banks trends S.E. and East nearly 1 mile to a patch of sand on it, dry at three-quarters ebb, and lying one-third of a mile to the north-eastward of Round head; the depth of water in the intermediate channel gradually decreases from 4 fathoms close to the head, to 10 feet near the edge of the sand. From this drying patch of sand the edge of the banks, which forms the northern side of Kelly channel, trends E. by S. $\frac{1}{2}$ S. $1\frac{1}{4}$ miles, and then curves N.E. by E. 2 miles to a spit projecting East a little more than a mile from River point.

A small patch of sand, covered at half flood, lies S.E. by E. half a mile from Sandy point; and there was said to be a narrow channel

through the sand-banks, winding from the south side of the point close to the sandy shore for about $1\frac{1}{2}$ miles, and then edging off in a S.S.E. direction, and having a shallow communication with Kelly channel.

BACKAGAIN POINT.—From Round head the south-western shore forms a bight extending nearly S.E. $1\frac{1}{2}$ miles to Backagain point, a high projection, having $4\frac{1}{2}$ fathoms close to it. The steep elevated shore of this bight is separated from the southern extensive sand-banks in front of it, by a narrow channel, which is said to be finally lost among the shoals to the eastward.

TABLE HEAD and LIBERTY POINT.—Between Backagain point and Liberty point, the northern extremity of a narrow sharp ridge of moderate elevation, lying E. by S. $2\frac{3}{4}$ miles from Backagain point, the coast forms two bights, separated by Table head, a high, steep, flat-topped point, E.S.E. $1\frac{3}{4}$ miles from Backagain point. Each of these two bights is about three-quarters of a mile deep, that to the westward being mostly occupied by shoal flats ; but the eastern bight is supposed to be free from dangers, though its depth of water is not known.

NETSEY and BIRD ISLETS lie respectively E. by S. three-quarters of a mile, and E. $\frac{1}{2}$ N. two-thirds of a mile from Backagain point ; the former, though little more than 1 cable in extent, is conspicuous ; but the latter is a mere rock. Both islets, together with the rocks about them, are connected with, and surrounded by the extensive sand-banks which stretch out $1\frac{3}{4}$ miles to the northward and north-eastward from Table head, and which are generally covered.

From a narrow bank or spit, with 3 and 4 feet water on it, at 3 cables' lengths north-eastward of Round head, the outer edge of the extensive sand-banks fronting the south-western shore trends E. by S. $\frac{3}{4}$ S. $1\frac{1}{2}$ miles, and from thence sweeps round eastward and southward $3\frac{1}{2}$ miles to Liberty point. The northern edge of these banks forms the southern side of Kelly channel.

At a quarter of a mile eastward of Round head is the entrance of a channel trending E.S.E. $1\frac{1}{2}$ miles in a parallel direction with Kelly channel, from which it is only separated by the narrow ridge which stretches out W.N.W. $1\frac{1}{2}$ miles from the extensive southern sand-banks. This channel is 2 cables wide, with $1\frac{3}{4}$ fathoms in its western entrance, and $3\frac{1}{2}$ fathoms at three-quarters of a mile within it, but only 6 feet at its eastern end, where the channel appears to be barred across by the sand-banks.

KELLY CHANNEL, the only known passage from the entrance channel into the deep water of Macquarie harbour, is about 100 yards wide, with 9 feet water at its western entrance, between the drying sand patch north-

eastward of Round head, and the narrow bank or spit to the south-eastward of the patch. From thence the channel trends between the northern and southern extensive sand-banks E. by S. $\frac{1}{2}$ S. $1\frac{1}{4}$ miles, with depths of $6\frac{1}{2}$ to 12 feet water. Kelly channel then gradually widens in an E.N.E. direction, to more than a mile in width at its eastern entrance between the sands. From 10 feet water in the narrows, N.N.E. of Backagain point, the depths increase to more than 12 fathoms in the eastern entrance.

SOPHIA POINT is a low projection of the north-eastern shore of Macquarie harbour, lying N.E. $\frac{1}{2}$ N. $2\frac{1}{2}$ miles from Liberty point, and is enclosed by a reef, with straggling rocks extending about 2 cables' lengths from it. This and River point, nearly W. by N. $\frac{1}{2}$ N. from it, form the entrance points of the northern arm of the harbour, which extends nearly 5 miles in a northerly direction.

PINE COVE is a bight in the eastern shore of the northern arm of Macquarie harbour, lying northward between $1\frac{1}{4}$ and $2\frac{1}{4}$ miles from Sophia point. In proceeding from Kelly channel to Pine cove the steep south side of the spit which projects from River point, must be approached with caution, as the soundings are very irregular; but from thence the depths gradually decrease to 3 fathoms within the cove, where there is good anchorage for small vessels in the latter depth, with muddy bottom.

SWAN BASIN, on the western side of the northern arm of Macquarie harbour, extends from 1 to $2\frac{1}{2}$ miles northward from River point. From the south extreme of this basin a narrow neck of land sweeps round north-eastward and northward nearly a mile, and terminates in a peninsula, half a mile long, E.N.E. and W.S.W. between which and a small island to the northward of it, is the narrow and only entrance into the basin. This small island, and the rocks to the northward of it, are connected with the north part of the basin by a dry sandy flat, which lines its shores. A vessel may lie completely land-locked in Swan basin; but from the narrowness of its entrance and the confined space within, it can scarcely be called a port.

KING RIVER.—From the northern entrance point of Pine cove a narrow peninsula extends N.W. two-thirds of a mile to the southern point of the mouth of King river, which is one-third of a mile wide; but it is encumbered by two islets, from the outer and smaller of which a shoal extends at least one-third of a mile to the south-westward, as there does also from the north-eastern entrance point of the river. King river takes its rise among the elevated hills to the eastward; but it is very little known.

The head of the northern arm of Macquarie harbour above King river and Swan basin, is formed by numerous points and bights, affording several

sheltered anchorages, secure from all but south-east and southerly winds ; but little appears to be known of this arm of Macquarie harbour above River point and Pine cove.

Productions.—The surrounding country affords abundance of timber, which is serviceable for various purposes, and a tree, usually called the Adventure Bay pine, which is fit for small spars. The latter grows to the ordinary height of 40 to 50 feet, and is from 12 to 16 inches in diameter, with leaves resembling parsley. These spars are generally rafted over the bar, and taken on board in the Outer road.

TIDE.—There is little or no set of tide in Pine cove, and its rise and fall does not usually exceed $1\frac{1}{2}$ feet.

The **SOUTH WESTERN** shore of Macquarie harbour from Liberty point trends South $2\frac{1}{4}$ miles, and nearly E. by S. three-quarters of a mile to a projecting head, forming the north-west entrance point of Double cove.

DOUBLE COVE is one-third of a mile wide at its entrance between two projecting points lying N.W. and S.E. from each other, within which it is little more than half a mile in extent, with only 6 to 8 feet water, and is much contracted by a projection near the middle of it, which renders the anchoring space very confined, even for the small vessels, which are enabled to cross over the Bar at the harbour's mouth. Good shelter for boats may, however, be found here ; and there are several runs of fresh water, crossing over the beach from the higher land behind.

From the south-east entrance point of Double cove the south-west shore of Macquarie harbour extends in an E.S.E. direction $4\frac{3}{4}$ miles, and then S.E. $\frac{1}{2}$ E. 2 miles to the north-west entrance point of the southern arm of the harbour. It consists of rocky points and small bights, mostly fronted by sunken rocks, none of which appear to extend more than a quarter of a mile from the shore. The land behind the shore, from Double cove to the southern arm of the harbour, chiefly consists of yellow loam and is thickly wooded.

HEAD QUARTERS ISLE.—Between the north-west entrance point of the southern arm of Macquarie harbour and the projection at 2 miles to the north-westward of it, the shore is fronted by a reef extending about a quarter of a mile from each point, and $1\frac{1}{4}$ miles from the shore midway between them. Head Quarters isle, the central and largest of the islets and rocks on this reef, and which lies S.E. $\frac{3}{4}$ E. $8\frac{1}{4}$ miles from Liberty point, is half a mile long N.E. by N. and S.W. by S. ; but is only 1 cable broad. It has dry and covered rocks close to each end, and there is a small islet on the spit of the reef at E.N.E. 4 cables' lengths from the north-east point of Head Quarters isle. There is anchorage in 4 to 6 fathoms in the

bight of the reef at about half a mile to the south-eastward of the island.*

BIRCH INLET, the southern arm of Macquarie harbour, is 2 miles wide at its entrance, W.N.W. and E.S.E., from whence it gradually narrows for about 2 miles to the south-westward, where it is only one-third of a mile wide, and after continuing this width nearly a mile to the southward, the channel opens into Birch inlet, a sheet of water above one mile wide, and extending 3 miles, and probably more, in a south-east direction.

GORDON RIVER flows into the south-eastern end of Macquarie harbour, between the south-eastern entrance point of the southern arm and another point at $1\frac{1}{4}$ miles to the north-eastward of it. Both entrance points of the river have rocks projecting about 1 or 2 cables' lengths from them, between which is a bar with 12 feet water on its deepest part, upon the south-west side of the entrance of the river. From thence Gordon river trends S.E. 2 miles, and after turning one mile to the north-eastward, it winds nearly 6 miles in an East direction, and then trends 4 miles southward to some marble cliffs on the west side, above which the river is formed by several streams flowing from the interior mountains. From 2 fathoms on the bar the depth of water increases to 10 fathoms at $2\frac{1}{2}$ miles within it, with navigable water for a vessel up to within half a mile of the falls.

COAL HEAD.—The north-western shore of Macquarie harbour, from a small bight on the south-east side of Sophia point, trends S.E. by E. 4 miles, and from thence South [nearly a mile to Coal head ; there is a small creek, or rivulet at $1\frac{1}{4}$ miles from Sophia point. The land behind this shore, although bad, is thickly wooded, and at or near Coal head a stratum of coal was said to have been discovered, but since found not to exist there.

Between Coal head and a projecting point at S.E. $3\frac{1}{4}$ miles from it are two bights, the north-western and deeper one being filled by a shoal flat which extends three-quarters of a mile from the shore ; but the south-eastern bight may be approached within a quarter of a mile of the shore in 2 to 4 fathoms. The land behind these bights is poor and heathy, rising inland to mount Sorell, E. by N. $\frac{1}{2}$ N. 7 miles from Coal head.

PHILLIP ISLE, S.E. $\frac{1}{2}$ S. between 1 and $1\frac{1}{2}$ miles from Coal head, is about 2 cables broad, and situated on the edge of a rocky shoal, which extends about half a mile from the broad projection, which separates the two bights just noticed. A dry rock lies between the island and the shore.

* On these islands there was formerly a Government establishment for convicts, who had been re-transported for crimes committed in the Colony.

PINE POINT, E. by S. three-quarters of a mile from the south extreme of the south-eastern bight before mentioned, is the extremity of an irregular projection of the north-eastern shore, stretching out nearly a mile in a S.W. direction, and separating a kind of basin on its north-west side, from the north-eastern arm of Macquarie harbour. This basin is more than a mile in extent each way, with a small island in the centre ; but its entrance has a reef stretching nearly half way across from the western side.

KELLY BASIN is a sheet of water $1\frac{1}{2}$ miles long, N.W. and S.E., and three-quarters of a mile wide, forming the head of the north-eastern arm of Macquarie harbour, which from its entrance between Pine point and the north-eastern entrance point of Gordon river, extends about $2\frac{1}{2}$ miles in a N.E. direction to the entrance of this basin, which is only half a mile wide. Nothing is known of the depth or capabilities of this branch of the harbour, nor of the basin on the north-west side of Pine point.

INLAND LAKE and RIVERS.—To the north-eastward of Kelly basin are some high ridges of white-topped mountains, which are visible from the borders of the river Derwent. On the summit of these mountains an extraordinary lake was discovered, in 1817, by Mr. Beamont, and reported by him to be of an angular form, and upwards of 50 miles in circumference. It is supposed to be the source of the Derwent, and of the Gordon and Birch rivers, the two latter of which flow into the south-eastern part of Macquarie harbour.*

The SOUNDINGS in Macquarie harbour, between the spit off River point and the reef projecting from Head Quarters isle, range from 13 to 20 fathoms in mid-channel, and from thence generally decrease to 10 and 6 fathoms within half a mile of the shore on either side. From 8 fathoms at a mile south-eastward of Head Quarters isle the depths decrease to 2 fathoms on the bar of Gordon river.

DIRECTIONS.—The north-west and westerly gales which frequently blow with great violence on the western coast of Tasmania, not only influence the tides in Macquarie harbour very considerably, but render it unsafe for any vessel to anchor outside the bar when there is a prospect of the wind blowing from those quarters, as there is no shelter between North and West, in the Outer road, for any but small vessels. The best anchorage there in fine weather, to wait for the tide on the bar, is in 6 or 7 fathoms water, sandy bottom, with the northern extremity of cape Sorell bearing W. $\frac{3}{4}$ S., and the eastern foot of mount Wellington just in sight through the narrow channel on the west side of Entrance islet. In this situation the distance from the north-eastern foot of Watts hill

* Horsburgh's East India Directory, vol. II., 5th ed., p. 706.

will be nearly half a mile, and somewhat more than from the nearest part of the bar.

To cross the Bar.—The marks for crossing over the deepest part of the bar, in 9 feet, at low water, are the centre of Entrance islet in line with the eastern pitch of the summit of mount Wellington ; and in proceeding in with these marks kept carefully in line, the depths will gradually decrease from 7 or 8 fathoms at three-quarters of a mile outside, to 9 feet on the bar, the latter depth continuing so for about 250 yards, when the small rock which lies close to the northward of Watts hill will open out a little from the land, bearing W. by N. $\frac{1}{4}$ N. Then steer S.W. and keep the sea horizon in view between the rock and the land, until the east pitch of mount Wellington comes over the west end of Entrance islet ; the vessel will then be just inside the bar, and may steer through the Inner road for the islet, with these marks in line, in 10 feet to 8 fathoms water.

There is good anchorage in the Inner road, between the Bar and Entrance islet, in 10 feet to 6 fathoms, clear sandy bottom, with the centre of mount Wellington over the west point of the narrow entrance ; but the breadth between the breaking water on each side is, in some parts, only a quarter of a mile. In working through the Inner road, the shoals on the east side should not be approached nearer than to bring the east pitch of the summit of Mount Wellington over the west end of Entrance islet ; nor the shoals on the west side nearer than to bring the centre of the narrow channel, on the west side of Entrance islet, in line with the inner extremity of Sandy point.

Great attention must be paid, not only to these marks and to obtaining quick soundings, but to the tide streams, which run here with great strength, and during freshes, have been experienced at the rate of 5 and 6 knots.

In sailing against the ebb through the proper channel into the harbour, which is between Entrance islet and the steep rocky head to the westward of it, keep the western shore aboard while passing the islet, as the tide stream sets strong out of a bight just within it, and is likely to drift a vessel upon the islet, if there be not a commanding breeze.

In proceeding up the channel from Entrance islet to mount Wellington, Bushy islet and the rocks to the southward of it must be left on the starboard hand, and in passing between Bushy islet and Sandy point, borrow towards the former, to avoid a spit projecting from the eastern extensive sand-banks to within 250 yards north-eastward of the islet. Having passed Bushy islet and the rocks to the southward of it, the deep channel will be close round the foot of Mount Wellington, and on its east side is about 330 yards wide, with 2 to 5 fathoms water. From this the depth

increases to 7 and 8 fathoms on the south-east side of the mount, where the channel is contracted to little more than half the above width, and the stream runs with increased velocity.

After rounding mount Wellington, a vessel may proceed through Channel bay by the Inshore passage, or by the Middle channel ; if the latter and more direct channel be preferred, steer for Round head, keeping the white mark half way up the hills southward of mount Wellington astern, bearing N.W. $\frac{1}{2}$ W. until the north-west extreme of the head nearly shuts in the west end of a sandy beach in the southern part of Channel bay. Then steer E. by N. $\frac{1}{4}$ N. so as to keep the end of the beach just in sight, bearing W. by S. $\frac{1}{4}$ S., which will lead into the narrow western entrance of Kelly channel, between the drying sand-patch and the spit or bank to the south-eastward of it. As there are only 3 feet water on the latter, a vessel will ground on it if the whole of the beach be shut in behind Round head.

Were a beacon, or even a branch of a tree, erected on the south extreme of the drying sand-patch, it being kept exactly under the white mark on the hills southward of mount Wellington, bearing W. by N. $\frac{3}{4}$ N., would lead directly through the narrow part of Kelly channel, in 7 and 8 feet least water ; which depth will oblige a vessel of greater draught either to wait for high water, or lighten sufficiently to enable her to run through.

When the centre of Betsey islet comes on with the western extreme of the flat summit of Table head, bearing S. by E. $\frac{1}{4}$ E., the narrows of Kelly channel will be passed, and an E.N.E. course for 2 miles will take a vessel into 7 or 8 fathoms water, in line between the eastern extremes of the extensive sand-banks on either side, giving a berth of half a mile to the spit which projects from River point, with Table head bearing S.S.W., when a course may be steered up the harbour, or according to destination.

In steering the E.N.E. course here recommended, the lead must be hove quickly, as the banks on each side are very steep, and the water shoals from 40 to 3 feet in the space of a few yards, being deepest near the edge of the northern shoals.

Productions.—The land in the vicinity of Macquarie harbour and the rivers which flow into it is said to be wholly unfit for cultivation, but the forests abound with various kinds of timber, fit for spars, boat-building, joiners' and cabinet work, and architecture. The tree, before described as the Adventure Bay pine, which is fit for spars and a variety of other purposes, grows about the south-eastern as well as the north-western parts of the harbour, and is of good height and size. Fish may also be procured in plenty near the rocky parts of the shore, and fresh water in almost every part.

TIDES.—The ordinary time of high water on the bar at the entrance of Macquarie harbour, full and change, is 7h. 30m.; rise 3 feet; but the time of high water and rise are both influenced by westerly and north-west gales, and by the great freshes that during the prevalence of rainy or thick cloudy weather, flow into the harbour from the high mountains in the interior, at which periods the channels between the shoals are deeper than usual. During Capt. P. P. King's stay of a fortnight in Macquarie harbour, the tides were found to be very irregular, making high water sometimes twice, and at other times only once in 24 hours, and in both cases the ebb ran twice as long as the flood, producing a difference in the level of the water, which on several occasions did not exceed the average fall of 18 inches.

Mr. Kelly, commander of the brig *Sophia*, and the original discoverer of Macquarie harbour, in 1816, says he has experienced a constant outset or ebb for nine days together, without the water rising or falling so much as one foot, although at other times, during north-west gales, the inundations have been very great, frequently overflowing the adjoining low lands to such an extent, that a large Huon Pine tree 16 inches in diameter, was left by the swollen waters on some sharp-pointed rocks on Entrance islet, at least 10 feet above the common level of the sea.

THE WEST COAST of Tasmania from cape Sorell extends S.S.E. $\frac{1}{4}$ E. 26 miles, and then S.W. $\frac{1}{4}$ W. $3\frac{1}{2}$ miles to point Hibbs, and consists of a series of rocky bights and projections. For the first 12 miles from the cape the coast is fronted by rocky ledges and rocks above water, generally extending about $1\frac{1}{2}$ miles from the shore. The land behind the whole of this coast rises by a gentle ascent, for 2 or 3 miles from the shore, and is apparently smooth and uniform, but destitute of wood and almost of other vegetation.

SLOOP ROCK, S. $\frac{1}{2}$ E. $10\frac{1}{2}$ miles from cape Sorell, is a small islet about $2\frac{1}{2}$ miles from the shore, with some sunken rocks at $1\frac{1}{2}$ miles to the northward, and others to the south-eastward of it.

HIBBS POINT and PYRAMID ROCK.—Hibbs point projects south-westward about 3 miles from the line of coast, and is higher than the neck by which it is joined to the back land. A remarkable pyramidal rock lies N.E. by N. nearly $2\frac{1}{2}$ miles from it, which, by an observer to the southward of the point, may be seen, when bearing N.N.E. over its extremity, appearing like the crown of a hat. A ledge of rocks projects about $1\frac{1}{2}$ miles from the extremity, and along the south side of Hibbs point, some of the rocks on the eastern part of the ledge being above water. There is a fresh-water pond near the shore, abreast of Pyramid rock, and at $1\frac{1}{2}$ miles to the south-eastward of the pond, a small stream flows into the bight on the south side of Hibbs point.

REPORTED ANCHORAGE.—From the small stream which flows into the bight on the south side of Hibbs point, the coast trends S.E. by S. $8\frac{1}{2}$ miles to a headland projecting $1\frac{1}{2}$ miles from the coast line; between this and a cliffy peninsular head. South of it, extending 3 miles from the coast, is an inlet half a mile wide, said to afford anchorage for small vessels. A reef, with a rock above water on it, extends 1 mile south-westward to $1\frac{1}{2}$ miles northward from the north head, and a larger reef, with High rocks on it, at 1 mile off shore, projects S.W. $2\frac{1}{2}$ miles from the cliffy peninsular head, which forms the south side of the reported anchorage.

MAINWARING COVE and INLET.—The former is the bight formed on the south side of the cliffy peninsular head just noticed, and Mainwaring inlet, which has a reef projecting from each side of its entrance, lies S.E. by E. $\frac{1}{4}$ E. $4\frac{1}{2}$ miles from the High rocks.

ROCKY POINT.—From Mainwaring inlet the coast curves slightly in a S.S.E. $\frac{1}{4}$ E. direction for about 8 miles to Rocky point, from which reefs extend about $1\frac{1}{2}$ miles to the south-westward and nearly a mile to the north-westward. The land between Hibbs and Rocky points is somewhat more elevated, and not so destitute of wood as that to the northward of Hibbs point, the summit of Junction range, at N. $\frac{1}{4}$ E., 8 miles from Rocky point being 1,210 feet high.

BLACK ROCK, N.W. 7 miles from Rocky point, and nearly 3 miles from the shore, is 20 feet high and surrounded by rocks and breakers, with another patch of rocks and breakers about 2 miles to the south-eastward of it.

ELLIOTT COVE.—Between Rocky point and a rounding projection of the land at S.E. $\frac{1}{2}$ E. 14 miles from it, the coast forms a bay 5 miles deep, the head of which is Elliott cove.

From the rounding projection which forms the south-east extreme of the bay just noticed, the general trend of the coast is S.E. 8 miles to point St. Vincent, between 2 and 3 miles to the north-westward of which is a small bight having two islets or rocks at 1 mile off its entrance; they lie close together and are connected by reef.

ASPECT.—The coast for about 18 miles to the south-eastward of Rocky point is high, and at the back are several bare white peaks, as if covered with snow; De Witt range, the most elevated of these peaks, S.E. by E. $\frac{3}{4}$ E. $17\frac{1}{2}$ miles from Rocky point, is 2,445 feet high.

POINT ST. VINCENT, NORTH HEAD, and DOCK ISLET.—Point St. Vincent and North head, at 2 miles to the south-eastward of it, are each fronted by a reef with dry rocks on it. Dock islet lies about 1 mile off the bight between the point and the head, and there is a detached reef about half a mile to the southward of North head.

POLLARD HEAD.—From North head the coast trends nearly E. $\frac{1}{2}$ S. $1\frac{1}{4}$ miles to Pollard head, the north-western entrance point of Port Davey : there are some sunken rocks close to Pollard head ; but there is a depth of 5 fathoms at one cable's length off it.

PORT DAVEY.—When nearing this port the land on either side presents a most rugged and barren aspect, and is steep and mountainous towards the East. The entrance, which is easily known by the high Pyramidal rock at three-quarters of a mile to the north-westward of Hilliard head, is $3\frac{1}{4}$ miles wide from Pollard head S.E. $\frac{1}{2}$ E. to Hilliard head ; it has a bold approach and is easy of access, the chief danger to be avoided being a sunken rock, said by Captain Stokes, to lie nearly midway between Pollard head and Pyramidal rock. The soundings across the entrance gradually increase from 5 fathoms at a cable's length off Pollard head to 27 fathoms near Stokes' reported sunken rock, and from thence decrease to 9 fathoms close to Pyramidal rock.*

Port Davey extends 10 miles from its south-eastern to its north-western extreme, and has several branches ; that which affords the most secure anchorages being apparently on the east side, which includes Bramble cove and Bathurst harbour.

HILLIARD HEAD is a high craggy projecting point, with some sunken rocks close to it, and a group of islets and rocks to the south-eastward of it.

CHATFIELD and STEPHENS ISLETS.—The positions of these islets appear to be doubtful ; but the former are, according to the Admiralty plan of Port Davey, five in number, some of which are high and peaked, with sunken rocks about them, lying within 1 mile to the south-eastward of Hilliard head ; and Stephens islet, which lies E.S.E. $1\frac{1}{2}$ miles from the head, close to the shore, to the eastward ; there are also some sunken rocks between this and Chatfield islets. But the Admiralty chart of Tasmania shows six islets, lying between S.S E. and S. $\frac{1}{2}$ W. from 2 to 3 miles from Hilliard head, of which the most remarkable is Sugarloaf rock, with a larger islet near the shore to the north-eastward of them. These appear to be the Chatfield and Stephens islets, which the plan places 2 miles to the northward of the positions assigned to them on the chart.

SOUTH-EASTERN SHORE of PORT DAVEY.—From Hilliard head to Forbes point, N.E. by N. 1 mile from it, the shore forms a bay, between which and Pyramidal rock is Swainson islet, with some sunken rocks close round it and a dry rock near its north-western extreme. There are 7 to

* See Plan of Port Davey, No. 2,130 ; scale, $\pi = 2$ inches.

10 fathoms between Hilliard head and Swainson islet, and 5 to 13 fathoms between it and Pyramidal rock.

On the east side of Forbes point is a cove about one-third of a mile in extent, having 4 and 5 fathoms water in it, from the east side of which the shore sweeps round a quarter of a mile to Knapp point, close off which is a small islet, lying N.E. $\frac{1}{2}$ N. two-thirds of a mile from Forbes point.

HANNANT POINT, which lies in line with this islet and Forbes point, distant 1 mile from the islet, is a narrow projection separating Spain bay on the south-west side, from Hannant inlet on the north-east side of the point. Spain bay has 8 to 11 fathoms across its entrance, close within which there is a sunken rock. This bay, which runs in about three-quarters of a mile from its entrance, appears not to have been sounded inside the sunken rock.

HANNANT INLET.—The entrance of this inlet is barely a quarter of a mile wide between Hannant point and Obrien point, to the northward of it, and is nearly barred across by a narrow islet extending above a quarter of a mile N.E. and S.W. close within the entrance. From thence the inlet runs nearly 3 miles to the southward, but has not been minutely surveyed.

NARES ROCK, N.E. by N. $1\frac{1}{4}$ miles from Pyramidal rock, is a sunken patch, with 2 to 5 fathoms water round it. There are more than 17 fathoms water between Swainson isle and Nares rock, and 18 to 7 fathoms between the rock and the cove to the southward of it.

SHANKS ISLETS, which are eight in number, lie in line with Pyramidal and Nares rocks and W. by N. 1 mile from Hannant point. These islets, which extend 4 cables' lengths, North and South, have sunken rocks close about them, but there is a clear channel, with 6 to 18 fathoms water, between the shore about Knapp point and a line from Nares rocks to Shanks isles, and 12 to 7 fathoms from Spain bay to 2 cables' lengths eastward of Shanks isles.

The EASTERN SHORE of Port Davey, from Obrien point, trends nearly N.N.W. $\frac{1}{2}$ W. $1\frac{1}{2}$ miles to Turnbull head, which forms the south-east side of the entrance of Bramble cove. There are 8 to 10 fathoms at a cable's length off shore, except at a third of a mile southward of Turnbull head, where a rocky ledge projects nearly a cable's length from the shore.

BRAKSEA ISLES extend from half a mile N.N.W. of the northernmost Shanks islet to three-quarters of a mile W. $\frac{1}{4}$ N. of Turnbull head. They are two in number, the southern and longer island being three-quarters of a mile long; but neither of them exceeds 300 yards in width. There is a dry rock near the south end of the southern island, and the shores of both have sunken rocks close along them; but there are 13 to 9 fathoms

within a cable's length of their west sides, and 4 to 6 fathoms at the same distance from their eastern sides, between which and the shore there are regular depths of 6 to 8 fathoms.

SOUTH PASSAGE, the channel between Shanks and Breaksea isles, is nearly half a mile wide, with 16 to 10 fathoms water; and there are 14 to 6 fathoms from the middle of the passage to within a cable's length of the ledge of rocks to the southward of Turnbull head.

NORTH PASSAGE, between Breaksea isles and a rocky patch which shows itself a few feet above water, to the N.N.W. of it, is one-third of a mile wide, with 10 fathoms water, and 7 to 8 fathoms between the passage and the entrance of Bramble cove.

BRAMBLE COVE is a safe and commodious harbour, having an entrance 3 cables wide, with 4 to 14 fathoms water, between Turnbull head and Milner head, one-third of a mile to the north-westward of it. There is a dry rock close to Turnbull head, and a sunken rock lies close to Milner head. Within the entrance, Bramble cove forms a basin extending 1 mile East and West and three-quarters of a mile North and South, with regular soundings, decreasing from 14 fathoms in the entrance to about 4 fathoms off the shores, except to the eastward of Turnbull head, where there are 10 to 15 fathoms.

There is a rock above water with some sunken rocks, close to the eastern shore; and on the south side is Sarah isle, which, though little more than 2 cables in extent, greatly contracts the entrance from Bramble cove into Bathurst harbour, through an opening between 3 and 6 cables' lengths eastward of Turnbull head, the east side of the opening being Hixson point.

BATHURST HARBOUR.—The entrance into Bathurst harbour from Bramble cove is 1 cable wide, with 9 to 16 fathoms, between a projection at a quarter of a mile eastward of Turnbull head and the south-west extreme of Sarah isle. There is also a very narrow passage, with $2\frac{1}{2}$ fathoms water, between the south-east point of Sarah isle and Hixson point.

From its entrance, Bathurst harbour trends eastward nearly 1 mile to Mundy isle, and for the first half-mile it is a quarter of a mile wide, with 7 to 14 fathoms in mid-channel; but from thence to Mundy isle the harbour is nearly half a mile wide, with 14 to 7 fathoms both in mid-channel and at a cable's length from the southern shore.

MUNDY ISLE, which is about a quarter of a mile long, lies midway between projections of the northern and southern shores, leaving a channel 1 cable wide, with 9 to 15 fathoms, between the south-west end of Mundy isle and the projection of the southern shore, and a 3-fathoms' channel

between the north-east end of the island and the point which projects from the northern shore.

From Mundy isle Bathurst harbour trends 1 mile eastward, with an average width of two-thirds of a mile, and regular soundings, decreasing from 11 fathoms in the centre to 5 and 4 fathoms at a cable's length from either shore. The only objects worth notice on either side are Deep point, at N.E. by E. one-third of a mile from the north-east end of Mundy isle, and Noon point, S.S.E. $\frac{1}{2}$ E. nearly two-thirds of a mile from Deep point; a small islet near the shore, lies a quarter of a mile to the westward of Noon point.

At a mile above Mundy isle, Bathurst harbour is only a quarter of a mile wide, but it increases to two-thirds of a mile in width at three-quarters of a mile farther to the eastward, with 3 and 4 fathoms at a cable's length from the southern shore, and 4 to 6 fathoms within two cables' lengths of the northern shore; but the middle of the channel has not been sounded.

SPRING RIVER.—At N.E. by E. $1\frac{1}{2}$ miles from Noon point is an islet which lies close off the mouth of Spring river, a stream flowing into Bathurst harbour from the northward; between this islet and an opening in the south shore, at half a mile to the southward of it, there are 5 to 11 fathoms water.

From the mouth of Spring river Port Davey becomes a narrow channel, winding about 4 miles in an easterly direction, when it opens into an extensive sheet of water, forming the head of the harbour. It has a cluster of small islets in its south-west corner, and a narrow branch extending above 4 miles to the southward.

KATHLEEN ISLE.—From Milner head to Ashley head, N.W. by W. $\frac{1}{4}$ W. 2 miles from it, the north-eastern shore of Port Davey forms a bay, fronted by Kathleen isle, which lies equidistant from the two heads and about half a mile from the shore. There is a cluster of islets and sunken rocks between the north extreme of the island and the shore; and between the Kathleen isle and the rocky patch to the southward of it is a channel 2 cables wide, with 5 to 10 fathoms water.

ASHLEY HEAD and BLUFF HEAD, at two-thirds of a mile to the north-westward of Ashley head, are each bordered by a rocky ledge; but may be approached within a cable's length in 6 and 5 fathoms water.

PYM POINT.—From Bluff head the shore curves northward nearly $1\frac{1}{4}$ miles to Pym point; it is intersected nearly midway by an inlet, close off which are three small islets, with some sunken rocks.

The WESTERN SHORE of Port Davey from Pollard head, curves in a N.N.E. $\frac{3}{4}$ E. direction $1\frac{1}{2}$ miles to Garden point, and from thence forms another curve extending N.N.W. $\frac{3}{4}$ W. 2 miles to Earle point. Between Garden and Earle points the shore is lined with rocks, and a shoal with sunken

rocks extends a quarter of a mile to the northward and eastward from Earle point.

WHALE COVE is a slight indentation of the coast between Garden point and a small islet near the shore at 1 mile to the north-westward of it. From this islet a rocky reef extends about half way to Garden point, and nearly two cables' lengths from the shore. There are 4 to 7 fathoms within 2 cables' lengths of the shore in the south-east part of the cove, where vessels may find tolerably sheltered anchorage in north-west or west gales ; but it is exposed to the wind and sea, if blowing hard from the S.W.

BOND BAY extends from Earle point N.N.W. $\frac{1}{2}$ W. $1\frac{3}{4}$ miles to Curtis point, and is $1\frac{1}{4}$ miles deep ; but nearly the whole bay is occupied by a flat having rarely more than 8 feet water on it, except in the entrance, where there are 2 to $2\frac{3}{4}$ fathoms, between half a mile N.N.W. of Earle point and a quarter of a mile south-eastward of Curtis point.

KELLY BASIN.—In the south-east bight of Bond bay, at $1\frac{1}{4}$ miles westward of Earle point, is an opening about 300 yards wide, having 9 to 12 feet water, which leads into Kelly basin, a circular sheet of water $1\frac{1}{4}$ miles in diameter ; it is filled by a shoal flat, except for about three-quarters of a mile to the south-westward from its entrance, where there are 12 to 6 feet water.

PAYNE BAY, the northern part of Port Davey, is a little more than 2 miles wide, East and West, at its entrance between Pym and Curtis points, from whence the bay extends $1\frac{3}{4}$ miles to the northward. The eastern shore of Payne bay from Pym point trends N.N.W. $\frac{1}{2}$ W. 1 mile to Woody point. Two small islets, with sunken rocks about them, lie N.W. one-third of a mile from Pym point, at nearly 2 cables' lengths from the shore ; and Woody point has three similar islets, with sunken rocks, extending nearly 2 cables' lengths from it.

From Woody point to Fitzroy point, W. by N. $\frac{3}{4}$ N. $1\frac{1}{4}$ miles from it, the northern shore of Payne bay forms a bight, having two small islets near the shore, at half a mile north-westward of Woody point, and another islet at three-quarters of a mile to the eastward of Fitzroy point, the shore being mostly lined with sunken rocks. Fitzroy islets, which are four in number, with sunken rocks about them, extend one-third of a mile southward and a quarter of a mile south-westward from Fitzroy point.

STEPHEN RIVER.—Above Payne bay the northernmost part of Port Davey, from the width of nearly $1\frac{1}{2}$ miles between Curtis and Fitzroy points, contracts to a quarter of a mile across, at the mouth of Stephen river, which flows from the northward into the head of the port, at W. $\frac{3}{4}$ N. $1\frac{1}{4}$ miles from Fitzroy point. Sunken rocks lie close along the northern

shore, and others extend about a quarter of a mile from the bights on either side of Observatory point, which lies $1\frac{1}{2}$ miles to the north-westward of Curtis point.

The northernmost part of Port Davey is filled by a shoal flat, having generally 6 to 8 feet water on it, the 12-foot edge of which from a quarter of a mile off Curtis point, trends N.W. by N. to about half a mile westward of Fitzroy point. At half a mile to the northward of Observatory point a ridge, with 3 to 4 feet water on it, stretches East and West nearly across from shore to shore.

SOUNDINGS.—From 25 fathoms midway between Pyramidal rock and Garden point, the soundings gradually decrease to 12 fathoms within a cable's length of the rock, and to 9 fathoms at a quarter of a mile from Garden point. From 5 fathoms close to Nares rock, the soundings increase to 23 fathoms at $1\frac{1}{2}$ miles in a N.W. by N. direction, and from thence decrease to 10 fathoms at 1 mile E.N.E. of Garden point. From a line between this point and Kathleen isle, where the depths increase regularly from 4 to 10 fathoms, the soundings up the harbour to Payne bay, decrease regularly to 4 fathoms. The shores on either side of the harbour, as far up as Earle point and Bluff head, may be generally approached within half a mile in 5 and 6 fathoms; but off Earle point, on the west side, and between Bluff head and Woody point, on the eastern side, there are only 3 and 4 fathoms at that distance from the shore.

DIRECTIONS.—With the assistance of the Admiralty plan, there will be no difficulty in entering Port Davey, by passing between Pollard head and the Pyramidal rock, taking care to avoid the sunken rock reported by Captain Stokes to lie nearly in mid-channel. In entering from the southward a good offing must be kept until Pyramidal rock bears N.E., to clear the high-peaked Chatfield islets.

For Whaler Cove.—In the event of being obliged to run into Port Davey through stress of weather, when blowing from N.W. or West, a vessel having cleared Pollard head and the reported sunken rock to the south-eastward of it, may haul round Garden point and anchor in 5 to 7 fathoms, in Whaler cove; but should the wind be from, or shift to the S.W., this anchorage would be unsafe, it being exposed when the wind and sea are from that quarter.

In working into Port Davey, the western shore between Pollard head and Garden point may be safely approached until the water shoals to 8 fathoms; but in standing towards the south-eastern shore, care must be taken to tack in time to avoid Nares rock.

For Bramble Cove.—If it be desirable to shift from Whaler cove to Bramble cove or Bathurst harbour, and the wind be not to the southward of S.W., run across for the North passage, by steering for the north

extreme of Breaksea isles ; pass between it and the rocky patch to the northward of it, and then into Bramble cove, which is easy of access either from the North or South passage ; both sides of it are bold, and may be approached within a cable's length in 4 fathoms, and the entrance is well protected by Breaksea isles, from the heavy sea which rolls into Port Davey. Bramble cove, or Bathurst harbour within it, is perfectly secure in the most boisterous weather, and will afford the most convenient and safe anchorage when necessitated to leave Whaler cove.

For Bathurst Harbour.—As the Admiralty plan will be a sufficient guide for entering Bathurst harbour from Bramble cove, it will be here only necessary to state that the proper channel is between Turnbull head and Sarah isle.

For Bond Bay.—If compelled by southerly gales to leave Whaler cove, and a vessel be unable to fetch Bramble cove, she should run up to the northward for Bond bay, taking care not to shoal the water to less than $3\frac{1}{2}$ fathoms, and to give Earle point a good berth, to avoid the sunken rocks which project to the eastward and northward from it. Having passed Earle point, and brought Bluff head to bear E. by S., haul into Bond bay till the peak of Pyramidal rock is just shut in with, and visible over Garden point, bearing S.S.E. $\frac{1}{2}$ E., and anchor in $3\frac{1}{2}$ to 3 fathoms, at half a mile off the north extreme of Earle point. Small vessels might run farther up the bay, and anchor in 3 to $2\frac{1}{2}$ fathoms, and be more sheltered from the sea that runs up the port.

For Bramble Cove from the Southward.—A vessel bound into Bramble cove from the southward, after rounding Pyramidal rock, may steer N.E. by N. for the South passage, and having passed between Shanks and Breaksea isles, enter Bramble cove as directed when proceeding from Whaler cove.

WORKING OUT from BRAMBLE COVE.—If the wind be from the northward or N.W., the South passage between Breaksea and Shanks isles would be the most practicable ; but if from the westward or S. W., the North passage is the more safe and convenient one for going out, leaving the rocky patch on the north side of that passage, on the starboard hand, and giving it a good berth. If necessary to tack when in this passage, a vessel should not stand within 2 cables' lengths of the rocky patch, or of the Breaksea isles, as the heavy swell which sets in may cause her to miss stays ; then, if not nearer than that distance, there will be sufficient space to bear up and go to leeward of either the rocky patch or the islands, where there will be from 8 to 10 fathoms within 50 to 100 yards of either, and ample room to get the vessel again under command.

TIDES.—From what was observed during 10 days' stay in Port Davey, there appeared to be no uniform motion in the tides, either in their ebbing

or flowing, or in their rise. It seems, however, that they are greatly influenced by the force and direction of the winds, for previously to a strong westerly breeze, the water rose from 4 to 5 feet, and ebbed but 2 feet. When the fine weather returned, 2 feet appeared to be the extent of the rise, and this was about the time the moon changed.

The COAST from $1\frac{1}{2}$ miles eastward of Hilliard, or S.E. head trends S.S.E. $\frac{1}{4}$ E. 11 miles to the South-west cape of Tasmania; the land is mountainous and presents a barren and desolate appearance.

CHAPTER VII.

TASMANIA.—SOUTH AND EAST COASTS.

VARIATION from $9^{\circ} 50'$ to $10^{\circ} 35'$ East in 1868.

SOUTH WEST CAPE is bold and remarkable, with a sharp and rugged outline. Approaching it from the westward, no danger is to be apprehended ; but in coming from the eastward and bound round it, as the prevailing winds are from the westward, it is necessary to keep a good offing, for the long westerly swell, which rolls in with great force, in conjunction with the current, which generally sets down the coast and towards the cape, throws a vessel very fast to leeward.

The **SOUTH COAST** of Tasmania extends from South-west cape, nearly East, 36 miles to South cape, and, as might be concluded from its exposed situation to the storms of the Polar regions, is rugged, abrupt, and barren, with some small islands lying from 3 to 12 miles off it. The projecting heads of land are supported by basaltic columns, like the Giant's Causeway in Ireland, and it is without any known places of shelter from onshore winds, although it contains two or three sandy bays.

Between two steep rocky heads bearing E.N.E., distant $3\frac{1}{2}$ and 7 miles from South-west cape, is a sandy bay, divided into two bights by a rocky point, with two clumps of rocks in the entrance.

COX BIGHT.—From the eastern point of the sandy bay just described, to the north-west point of Louisa bay, at E. by N. $\frac{1}{2}$ N. $6\frac{1}{2}$ miles from it, is an indentation of which the western corner forms Cox bight, a deep sandy, but exposed bay. From Cox bight to Louisa bay the coast rises to Bathurst range, which attains an elevation of 2,626 feet.

LOUISA BAY and HIGH BLUFF.—Louisa bay extends about one mile from N.W. to S.E., and has an islet in its entrance. From the south-east point of the bay the coast trends E.S.E. 3 miles to High bluff, the appearance of which may be inferred from its name.

MAATSUYKERS.—NEEDLE ROCK.—Maatsuykers are two principal and several smaller isles lying between 3 and 9 miles off High bluff ; the outer and larger of the two principal isles, which lies E. by S. $\frac{1}{2}$ S. 13 miles from South-west cape, has a reef projecting to the south-westward, on which is the Needle rock. There are several islets and rocks on a reef

which extends to the northward from the island. The inner of the two principal Maatsuykers lies midway between the outer isle and High bluff. There is a sunken rock midway between Louisa bay and the inner isle, and at S.S.E. $2\frac{1}{2}$ miles from the latter is a cluster of rocks above water.

MEWSTONE, S.E. $6\frac{1}{2}$ miles from the outer principal Maatsuyker isle, is a clifly islet 253 feet high, and in form resembles a lion's head ; there are rocks close to the eastward and westward of it.

SOUNDINGS.—There are 61 to 45 fathoms between Maatsuykers and Mewstone ; but vessels are recommended to pass to the southward of Mewstone, at S.W. 6 miles from which there are 85 fathoms, coral and fine brown sand.

The coast from High bluff trends N.E. 7 miles to an inlet, and from thence extends S.E. $\frac{1}{2}$ E. 12 miles to the west entrance point of South Cape bay, at 2 miles to the north-westward of which is Fluted point. Two rocks above water, lie close off a clifly point at 3 miles to the south-eastward of the inlet just noticed, and at S.S.W. $2\frac{1}{2}$ miles from the outer of these two rocks is I. du Golfe ; there is also a small islet, or rock near the shore at two miles to the north-westward of Fluted point.

LA PEROUSE.—From 3 miles south-eastward of the inlet just noticed, to South Cape bay the coast mostly consists of high cliffs, from which the land rises to a lofty range, La Perouse, at North 8 miles from the west entrance point of South Cape bay, being 3,800 feet high. From La Perouse one ridge trends to the north-westward, and the main range 25 miles to the northward, the most elevated summit being Adamson peak, which bears N. by E., distant $9\frac{1}{2}$ miles from La Perouse, and is 4,017 feet high.

SOUTH CAPE BAY extends East five miles across from its west entrance point to Three Hillock point, and is 3 miles deep ; but it is too open and exposed to deserve farther notice. There are some ponds of fresh water behind the eastern bight of the bay, at $1\frac{1}{2}$ miles to the northward of Three Hillock point.

SOUTH CAPE, of which Three Hummock point forms the south-west extremity, is a broad projection terminating eastward at Whale head, which lies E.N.E. 2 miles from Three Hummock point. At two miles to the northward of the cape the land rises to Bare hill, which is 909 feet high.*

SOUNDINGS.—From 45 fathoms at $4\frac{1}{2}$ miles north-eastward of Mewstone to 2 miles south-westward of South cape there is no bottom at 40 fathoms.

* See Chart of Approaches to Derwent river and Hobart Town, on Chart of Tasmania, No. 1,079 ; scale, $\pi = 0.45$ of an inch.

PEDRA BLANCA and EDDYSTONE, S.E. by S. and S.E. $\frac{1}{4}$ S. 14 miles from Three Hillock point, are 2 clifly islets connected by a rocky reef, and lying N.E. by E. $\frac{1}{2}$ E. and S.W. by W. $\frac{1}{2}$ W. $1\frac{1}{2}$ miles from each other; the former, which is the Swilly of Furneaux, is like Pedra Blanca near the coast of China, and the Eddystone resembles an ill-shaped tower.

SIDMOUTH ROCK, N.E. $\frac{3}{4}$ N. 5 miles from the Eddystone, is about 100 yards in diameter and is above water, with a reef projecting about half a mile to the north-eastward from it. There is no bottom at 20 fathoms close round this danger, and the passage between it and the Eddystone appeared safe.

The channel between these islets and the South cape of Tasmania is 12 miles wide; and near the middle of it 60 fathoms water have been found, on broken coral and shells.

RURICK ROCK is said to have been seen by the Russian ship *Rurick*, in 1822, and to lie nearly E. $\frac{1}{2}$ S. 33 miles from Pedra Blanca, or in lat. 44° S., long. $147^{\circ} 44'$ E.

D'ENTRECASTEAUX CHANNEL is a smooth-water passage between the south-east coast of Tasmania and Bruny island, leading from the south-eastward to the Derwent river and Hobart Town, the capital of Tasmania. The southern entrance of this channel extends from South cape nearly N.E. by E. 20 miles to Tasman head, the south point of Bruny island, with soundings in 60 to 50 fathoms for about two-thirds of the distance across from the cape. The channel, which is slightly winding, is about 35 miles long, from S. by W. $\frac{1}{2}$ W. to N. by E. $\frac{1}{2}$ E.; but its width is very irregular, varying from 4 miles within the southern entrance, to little more than half a mile in the northern entrance, the depth ranging from 40 to 5 fathoms in the fairway.

The western coast of D'Entrecasteaux channel from Whale head, trends nearly N.N.E. $\frac{3}{4}$ E. $3\frac{1}{4}$ miles to a rocky projection, on the north side of which is a Landing-place; this coast may be approached within a quarter of a mile in 19 to 4 fathoms. From the landing-place a rocky indentation, with deep water near the shore, trends N. $\frac{1}{2}$ W. three-quarters of a mile to Second Look-out, and from thence a rocky, but bold shore extends N.N.W. $\frac{1}{2}$ W. three-quarters of a mile to Arthur point, the southern entrance head of Recherche bay.

RECHERCHE BAY.—SUNKEN REEF.—The entrance of this bay extends from Arthur point N. by W. $\frac{1}{4}$ W. $1\frac{1}{2}$ miles to Sullivan point, from which the Image rocks extend about half a mile to the eastward. Some of these rocks are even with the water's edge and others are more elevated. At E. by S. $\frac{1}{4}$ S. $1\frac{1}{2}$ miles from the northern entrance head of Recherche bay is Sunken reef, upon which the sea breaks but little in

very moderate weather, and the soundings decrease suddenly from deep water to 3 fathoms close to the reef. There are 20 to 16 fathoms between Arthur point and Sunken reef, and 16 fathoms between it and Image rocks; but at 3 cables' lengths north-eastward of the reef there are only 3 fathoms water.

SOUTHERN ARM.—Recherche bay does not extend more than a mile to the westward from its entrance, but it has two arms, forming very secure anchorages; one trending to the south-westward, and the other to the northward. The entrance of the southern arm, or Rocky bay, is nearly two-thirds of mile wide between Arthur point and Fishery point, a projection of the western shore, at N.W. by W. one mile from it; but it is divided into two channels by the Mutton rocks, a small cluster of dry and covered rocks with apparently a passage on either side; that, however, on the north-west side, although having a depth of 3 fathoms, is so choked with weed, that it is with difficulty a boat can pass. The channel on the east side of Mutton rocks has depths of 5 to 4 fathoms. From its entrance the southern arm extends $1\frac{1}{2}$ miles in a S.W. direction to Cockle creek, and has 6 to $2\frac{3}{4}$ and 5 fathoms water, affording secure anchorage, on fine sand, in any depth suited to a vessel's draught.

Water.—The shores round the southern arm are covered with thick wood, rising to a considerable height, and there are two or three rocks above water at its southern extremity. Fresh water may be obtained at a little cove on the western shore.

From Fishery point the western shore of Recherche bay trends North half a mile, and then curves round north-wesward three-quarters of a mile to Catamaran river, which is one cable wide, with 6 feet water in the entrance. From this river the western shore curves northward and north-eastward nearly one mile to the western entrance point of the northern arm, or, as it has been named, the Pig-sties; from this point a ledge of rocks projects 2 cables' lengths to the southward, of which the southernmost is Gull rock. The western shore is closely bordered with rocks, immediately outside which there are 3 fathoms water, with $5\frac{1}{4}$ fathoms in the centre of the bay, between its western shore and Sullivan point, and 12 fathoms a little farther out. Near the northern part of the bay there is a bank of weed. From Sullivan point the shore, which is bordered by rocks above water, trends W.N.W. three-quarters of a mile to a small point of remarkable rocks close to Observatory point, which forms the east side of the entrance of the northern arm of the bay.

The NORTHERN ARM of Recherche bay is one-third of a mile wide at the entrance, which is divided into two channels by the Shag, a small rock above water, between which and the east point there are 5 to $6\frac{1}{2}$ fathoms in mid-channel, and 2 fathoms near Shag rock, and also near the

point; this channel, although narrow, is easily distinguished. From the entrance the northern arm extends nearly $1\frac{1}{2}$ miles northward to D'Entrecasteaux river, and is two-thirds of a mile wide, with depths of 5, 4, and 3 fathoms up to three-quarters of a mile above the entrance.

The sloping shores of this excellent harbour are covered with thick wood, and the water is so smooth that it is scarcely agitated with the most violent winds. Its general depth is about $3\frac{1}{2}$ fathoms, with black muddy bottom, in which the anchors bury themselves, and vessels may ground without danger.

DIRECTIONS.—In entering the northern arm from the south-eastward, steer towards Shag rock, until abreast of, and close to the small point of remarkable rocks, and leave on the starboard hand a mass of weed connected with the rocks at the bottom, having in the centre only $2\frac{1}{2}$ fathoms water. In passing Observatory point keep it open on the starboard bow, taking care not to go so far to the westward of it as to open Shag rock outside the southernmost point of land.

Water may be obtained on the western shore of the northern arm of Recherche bay.

ACTÆON ISLES and SHOALS, which lie about 3 miles off Recherche bay, are two small isles, with many rocks and reefs, extending from about 3 miles eastward to $4\frac{1}{2}$ miles N.E. $\frac{3}{4}$ N. of Arthur point, and $1\frac{1}{2}$ miles across the middle of the group.

STERILE ISLET and S.E. BREAK.—Sterile islet, the southern of the Actæon isles, lies N.E. by E. $\frac{1}{4}$ E. $3\frac{1}{2}$ miles from Arthur point, and is about 2 cables in extent, with dry and covered rocks close to the eastward and westward of it, and a reef extending from it a quarter of a mile to the north-westward and $1\frac{1}{4}$ miles in a S.S.E. direction, with 10 to 13 fathoms within a quarter of a mile of its eastern edge. S.E. Break, which is the southern part of this reef, has sunken patches on it at three-quarters of a mile from Sterile islet. The *Wallace* was wrecked on one of these patches, upon which the sea does not always break.

SOUTH BREAK, E. $\frac{1}{2}$ N. 3 miles from Arthur point, is about a quarter of a mile in extent, with 6 to 20 fathoms close to the south-west and westward of it, and a passage a quarter of a mile wide, between it and S.E. Break, through which no stranger should attempt to pass. The water shoals suddenly from 8, 7, and 6 fathoms to the reefs, on which there are 2 to 3 fathoms; and in heavy weather the sea breaks in 8 fathoms.

The NORTHERN ACTÆON ISLE, which lies N. $\frac{1}{2}$ W. between 1 and $1\frac{1}{4}$ miles from Sterile islet, is nearly divided into three by two narrow necks, the northern being dry at low water, and the other neck always dry.

A rock lies close to the north point of the island, from whence a reef projects nearly 2 cables' lengths to the northward. Some rocks also above water, lie 2 cables' lengths south-westward of the south point of the island; and at about the same distance to the eastward of the point is a patch, on which the *Actæon* was wrecked. From the south end of this island a reef extends three-quarters of a mile to the southward, leaving between it and Sterile islet a passage a quarter of a mile wide, with $6\frac{3}{4}$ to 9 fathoms water in it.

DEEP WATER BANK, the easternmost of the *Actæon* shoals, is a small patch lying N.E. by E. $\frac{1}{2}$ E. one mile from Sterile islet, with 8 to 10 fathoms close round it.

BLACK REEF, which lies nearly in line between the northern *Actæon* isle and Arthur point, distant $1\frac{1}{2}$ miles from the former, is a cluster of rocks a few feet above water, and about a quarter of a mile in extent. This reef is surrounded by deep water, suddenly shoaling to 3 fathoms close round it; there are 8 fathoms between it and the shore to the north-westward, and 12 to 15 fathoms between the reef and the northern *Actæon* isle.

With the exception of the shoals which have been enumerated, the space between Recherche bay and the *Actæon* group, appears quite free from dangers, with generally about 8 or 10 to 20 fathoms water.

From Sullivan point a low shore—behind which is Black Swan lagoon—trends N.E. $\frac{1}{2}$ N. $1\frac{1}{4}$ miles to a more elevated coast, which turns half a mile south-eastward to Eliza point, close off which are the Eliza sunken rocks.

SOUTH PORT LAGOON.—From Eliza point a rocky coast sweeps round in a northerly direction $1\frac{1}{2}$ miles to a narrow tongue of land, extending N.N.E. nearly 2 miles to the entrance of South Port lagoon, which is little more than 1 cable wide, and has generally a heavy surf across it; but within the entrance the lagoon is 3 miles long, from S. by W. $\frac{1}{2}$ W. to N. by E. $\frac{1}{2}$ E., and is nearly $1\frac{1}{2}$ miles wide; the greater portion of it being separated from the sea by the narrow tongue of land, just mentioned.

GEORGE III. ROCK is a small patch with 8 feet water on it, upon which a vessel of that name was wrecked: it lies nearly midway between the northernmost *Actæon* isle and the entrance of South Port lagoon, and N.N.E. $\frac{3}{4}$ E. 2 miles from Eliza point. The sea seldom breaks upon this rock except in heavy weather; and in moderate weather, only at intervals of some hours; its position is sometimes shown by a heavy swell passing over it without breaking. With this exception there appears to be a clear

channel, with 10 to 7 fathoms water, between the Actæon group and the coast from Eliza point to the entrance of South Port lagoon.

SOUTH PORT BLUFF, BLANCHE ROCK, and SOUTH PORT ISLE.—From the north-eastern entrance point of South Port lagoon the coast curves $1\frac{1}{4}$ miles in a N.E. by E. direction to South Port bluff, at one-third of a mile south-eastward of which is Blanche rock, above water, and situated on the north-western edge of a reef, about one-third of a mile in diameter. South Port isle lies one-third of a mile north-eastward of the bluff, on the northern part of a reef of rocks about half a mile in extent.

SOUTH PORT.—From South Port bluff the coast trends N.N.W. nearly 1 mile to a rocky point, with a rock close off it, at half a mile to the north-westward of which is a projection, with 3 fathoms close to it, forming the south-western side of the entrance of South port, from whence the entrance extends across N.N.E. $1\frac{1}{2}$ miles to Rossel point, close off which is a rock above water, with 9 fathoms within a cable's length of it.

From the entrance, South port extends 2 miles in a W.N.W. direction, the depth of water decreasing from 17 fathoms in the middle of the entrance to 14, 9, and $3\frac{3}{4}$ fathoms within a quarter of a mile of the western shore. The south-western shore of the port is fronted by a shoal projecting two-thirds of a mile to the eastward, on which is situated Pelican islet, at $1\frac{1}{4}$ miles north-westward of the south-western entrance point. There are 4 and 5 fathoms, on fine grey sand, in a small bight formed in the shoal on the south side of Pelican islet. At half a mile westward of the islet is a narrow opening communicating with a shallow muddy inlet, forming three branches and trending about $2\frac{1}{2}$ miles to the north-westward.

HYTHE.—The north shore of South port, which forms the water frontage of Hythe, consists of alternate bays and points, with fine slate near the shore, at about three-quarters of a mile northward of Pelican islet.

BURNETT POINT.—SISTERS and LADY BAYS.—From Rossel point the coast trends N.E. by N. three-quarters of a mile to Burnett point, from whence Sisters bay extends N. $\frac{3}{4}$ W. $1\frac{1}{2}$ miles, and is two-thirds of a mile deep ; but its inner part, and the shore between it and Burnett point, are bordered by dry and covered rocks. Between the northern extreme of Sisters bay and a rocky projection at N. $\frac{3}{4}$ E. $1\frac{1}{2}$ miles from it, are Lady bay and a smaller bight to the northward of it. Lady bay has some rocks near the shore, and a small stream flowing into it. From the bight northward of Lady bay the coast extends N. by E. $\frac{1}{4}$ E. 2 miles to Scott point, this point having at a quarter of a mile to the northward of it, a small patch, on which the *Katherine Shearer* was wrecked. This coast is bordered by reefs extending 3 to 2 cables' lengths from the shore, but there

are 10 to 7 fathoms water at half a mile from the shore, between Burnett and Scott points.

PORT ESPERANCE.—From Scott point the coast sweeps round north-westward two-thirds of a mile to a projection between which and Esperance point, N. by E. $\frac{1}{2}$ E. a little more than 1 mile from it, is the entrance of Port Esperance, which extends from thence $2\frac{3}{4}$ miles in a W. by N. direction, and is $1\frac{3}{4}$ miles wide. Hope isle, which is nearly half a mile in extent and covered with trees, lies 1 mile within the entrance, dividing it into two channels, that on the south side of the island being one-third of a mile wide, with 15 to 25 fathoms in it, over mud and sand, where a vessel may be sheltered from all winds.

Water.—There is a narrow bight in a sort of ravine formed between the heights of Folkestone on the southern shore, to the south-westward of Hope isle, having 7 fathoms in the entrance and $4\frac{1}{2}$ to $2\frac{3}{4}$ fathoms farther in ; and affording shelter for heaving down a vessel. At the bottom of the bight is a rivulet of excellent water.

At nearly a mile to the westward of Hope isle, a point of the southern shore projects to the northward, on the west side of which is the entrance of an inlet, one-third of a mile wide, with 8 fathoms in mid-channel, and 8 and 9 fathoms between it and Hope isle. From its entrance the inlet winds about $1\frac{3}{4}$ miles in a W.N.W. direction to a point which divides it into two branches, one trending half a mile to the southward, and the other about the same distance westward to Esperance river. At one-third of a mile within the entrance of this inlet is Rabbit islet, between which and the western entrance point there is a narrow passage, with $4\frac{1}{2}$ to $2\frac{1}{2}$ fathoms, and $3\frac{1}{2}$ fathoms water within the islet, above which the channel appears to be obstructed by small islets or rocks. A vessel may lie in this inlet perfectly landlocked.

Between Esperance point and Dead islet, close to the northward of Hope isle, there are 15 to 7 fathoms water ; but at three-quarters of a mile to the north-westward of the islet are two rocks bordered by reefs. There is a rivulet at half a mile to the north-westward of the two rocks ; but the water is brackish, and difficult to be obtained.

ROARING BAY.—From Esperance point the coast trends N. by E. three-quarters of a mile to a point, having a small bight on its west side ; between this point and another projection about N. by E. $\frac{1}{2}$ E. 2 miles from it, there is an indentation, of which the northern bight is Roaring bay. From the north-east point of this bay the coast trends North two-thirds of a mile to Huon point, the western entrance point of Huon river : at about a mile westward of Huon point the land rises to mount Esperance.

TASMAN HEAD and FRIAR ROCKS.—Tasman head, the south extreme of Bruny island, which forms the north-eastern point of the

southern entrance of D'Entrecasteaux channel, is high, abrupt, and composed of basaltic pillars, with a shoal extending from it between S. by W. and S.E. by S. $1\frac{3}{4}$ miles, on which are several small islets and numerous rocks, some of the former producing vegetation. The two easternmost of the Friars rocks are pyramidal in shape, and, except where whitewashed by the gannets, have a black, weatherbeaten appearance; a patch of breakers is said to lie 1 mile to the north-eastward of them, but the south-easternmost of these dangers appears to be a patch lying S.E. $\frac{3}{4}$ S. 2 miles from Tasman head.

Between Tasman head and East head, nearly W.N.W. $2\frac{1}{4}$ miles from it, the coast is somewhat embayed, with high land behind it, mount Bruny, at about N.N.W. 2 miles from Tasman head, being 1,059 feet high.

CLOUDY BAY, a bight in the southern end of Bruny island exposed to all the fury of south-west gales, is 3 miles wide, E. $\frac{3}{4}$ N. and W. $\frac{3}{4}$ S., at its entrance between East and West heads, from whence it extends $3\frac{1}{4}$ miles northward to a long narrow tongue of land stretching westward from the eastern side, and separating this bay from Cloudy lagoon. The eastern shore of Cloudy bay for the first $1\frac{3}{4}$ miles is rocky and irregular, the most projecting danger being a reef with dry rocks upon it, extending one-third of a mile from a point at about midway between East point and the head of the bay. Another reef projects from the north extreme of this point, on the east side of which is a small bight, with $3\frac{1}{2}$ to $1\frac{1}{2}$ fathoms water in it. The east side of Cloudy bay between this bight and a projection of the northern shore appears to consist of a sandy beach. The western shore has several small open bights, and the head of the bay is exposed to a great surf.

CLOUDY LAGOON is a very shallow sheet of water $1\frac{3}{4}$ miles long, E.N.E. and W.S.W., $1\frac{1}{4}$ miles wide, and communicates with the north-west corner of Cloudy bay by a narrow channel trending North and South two-thirds of a mile. The land for about $1\frac{1}{2}$ miles northward of the lagoon is low and swampy.

The coast between West head and another point lying S.W. by W. $\frac{3}{4}$ W. from it, and S.E. half a mile from cape Bruny, forms an exposed bay $1\frac{1}{2}$ miles wide and three-quarters of a mile deep, its bight being apparently a sandy beach.

CAPE BRUNY REVOLVING LIGHT.—Cape Bruny, the south-west point of Bruny island, is 291 feet high, with mount Barren at 1 mile to the northward of it. The cape is distinguished by a *white* light-house, 44 feet high, which exhibits, at the elevation of 335 feet above the level of the sea, a light, which revolves every minute and 40 seconds, and is visible in clear weather, at the distance of 22 miles.

COURTS ISLE extends from a few yards to half a mile southward of cape Bruny, and is nearly a quarter of a mile wide, with dry and covered rocks extending a quarter of a mile southward and south-westward from it.

SOUNDINGS.—At $2\frac{1}{2}$ miles southward of Tasman head there are 20 fathoms, rock, and at S.S.W. $3\frac{1}{4}$ miles from the head there are 25 fathoms, also over rocky bottom; but between these depths there is no bottom at 40 fathoms. From the latter depth to within $1\frac{1}{2}$ miles of the entrance of Cloudy bay there are 29 to 27 fathoms, and from South round by S.W. to N.W. at the distance of 4 miles from cape Bruny, there are 50 to 29, 33 and 28 fathoms, with regular soundings between these depths and the south-west coast of Bruny island.

STANDAWAY BAY is an indentation of the south-western coast of Bruny island, extending from cape Bruny N.W. $\frac{1}{2}$ N. $4\frac{1}{2}$ miles to a cluster of rocks, above water, projecting a quarter of a mile from the shore at one-third of a mile southward of the west point of the island. This bay, which is barely three-quarters of a mile deep, has a rocky exposed shore, with several detached dangers lying between 2 and 3 cables' lengths from it; on one of these, at half a mile north-westward of cape Bruny, was a wreck. At about three-quarters of a mile to the south-eastward of the north-west extreme of the bay mount Bleak rises from the shore.

At N. by E. half a mile from the west point of Bruny island is a projection having some rocks above water close to its west side, at E.N.E. three-quarters of a mile from which is a third point forming the south-west side of the entrance of Great Taylor bay, which is separated from D'Entrecasteaux channel by a promontory stretching out nearly 4 miles in a N.W. direction from about a mile northward of mount Barren, and is three-quarters to $1\frac{1}{2}$ miles broad.

PARTRIDGE ISLE, which extends about 1 cable's length to $1\frac{1}{2}$ miles northward from the north-west point of this promontory, is one-third of a mile broad, with 18 to 7 fathoms water close to its west shore, and a Landing-place on its east side.

GREAT TAYLOR BAY.—The entrance of this bay is $2\frac{1}{2}$ miles wide from W.S.W. to E.N.E., and runs in about $3\frac{1}{4}$ miles in a S.E. $\frac{1}{2}$ S. direction. The western shore for the first $2\frac{1}{2}$ miles is nearly straight, and from thence to the bottom of the bay is irregular. A patch, which covers at high water, lies near this shore at $2\frac{1}{2}$ miles from the western entrance point. The eastern shore of Great Taylor bay consists of projecting points and bights; the most extensive of the latter being the Bay of Islands, which lies midway between the north-eastern entrance point and the south extreme of Great Taylor bay. The Bay of Islands is about half a mile wide at its entrance, from whence it runs in nearly a mile to the north-

ward. Curlew islet lies close off the northern point of the entrance of the Bay of Islands, and there is a smaller islet close to the southern shore of this bay. Oak point, S. by E. $\frac{1}{2}$ E. $1\frac{1}{2}$ miles from Curlew islet, is the southernmost projection of the eastern shore; the bight to the south-westward of the point is apparently formed by a sandy beach.

Great Taylor bay is too large to afford at all times shelter from gales. M. Freycinet anchored off the entrance at 1 mile to the eastward of Partridge isle, and although on weighing the anchor it brought up 1,000 lbs. weight of hard black mud, which the motion and wash of the sea did not detach, the vessels frequently dragged their anchors, even with a long scope of cable.

VENTENAT POINT.—From the eastern entrance point of Great Taylor bay the general trend of the western coast of Bruny island, which is slightly embayed, is nearly North $3\frac{1}{2}$ miles to Ventenat point. This point, which forms the south-west side of the entrance of Little Taylor bay, is the north extremity of a tongue of land projecting N. by W. $\frac{1}{2}$ W. $2\frac{1}{4}$ miles, and separating Little Taylor bay from D'Entrecasteaux channel. There are 24 to 13 fathoms between Partridge isle and Ventenat point, but a reef projects a short distance northward from the point.

LITTLE TAYLOR BAY is $1\frac{1}{2}$ miles wide, N.E. by E. and S.W. by W., at the entrance, from whence it extends about S. by E. $2\frac{1}{2}$ miles. There is a small bight in the western shore of the bay, at half a mile within Ventenat point; and there is a larger, but apparently more shallow one, in the eastern shore, between three-quarters of a mile, and $1\frac{1}{2}$ miles from the north-eastern entrance point of the bay. This, like Great Taylor bay, is said to be capable of receiving the largest vessels, although the anchorage in neither of them appears to be much recommended.

The western coast of Bruny island from Little Taylor bay takes a general N. by E. $\frac{1}{2}$ E. direction $6\frac{3}{4}$ miles to Simpson point, the north extremity of a projecting part of the island, stretching out $3\frac{1}{4}$ miles to the northward, and separating Isthmus bay on its east, from D'Entrecasteaux channel on its west side.

SATELLITE ISLE, N.N.E. $\frac{1}{2}$ E. $2\frac{1}{4}$ miles from Ventenat point, and at half a mile from the shore, is about two-thirds of a mile long, N.W. and S.E., and a quarter of a mile broad, with 9 fathoms water near its north-west end, and 7 fathoms between it and Ventenat point.

ZUIDPOOL ROCK, which is about 50 yards in extent, and has 9 feet water on it, lies in midway between Ventenat point and Huon isle, with the north-east extremes of Huon and Garden isles in line, bearing N.W. by N., and Satellite isle E. by N., Huon and Satellite isles being

each distant 2 miles. The Admiralty chart shows no soundings within about half a mile of this danger; but as it lies nearly in the fairway, it may be presumed there is deep water near it, although it should be passed with caution. A large *black* can buoy has been moored on this danger.

HUON ISLE, which lies close off the entrance of Huon river, at $1\frac{2}{3}$ miles eastward of Huon point, is three-quarters of a mile long, N.E. and S.W., and one-third of a mile broad, with 16 fathoms water at half a mile off its south-east point.

HUON RIVER.—ADELAIDE.—Huon river is $2\frac{3}{4}$ miles wide at its entrance from Huon point to another point bearing E. by N. from it; a cluster of rocks lies off this point, between which and Huon isle there is a channel two-thirds of a mile wide. The south-western shore of Huon river from Huon point, extends N.W. by W. $6\frac{3}{4}$ miles to a projecting part of Adelaide, between Surges bay on its south-east side and Flight bay to the north-westward of it. The objects along this shore which appear most worthy of notice, seem to be Surveyor bay, at two-thirds of a mile within Huon point; Police point, N.W. 2 miles from Surveyor bay; Desolation bay, W. by N. $\frac{1}{2}$ N. $1\frac{1}{2}$ miles from Police point; and White bluff, N.W. $\frac{1}{2}$ W. $1\frac{1}{4}$ miles from Desolation bay; close to the westward of the bluff is the Flower-pot rock, above water.

The BUTTS.—The north-eastern shore of Huon river, from its eastern entrance point, trends N.W. by W. $1\frac{1}{4}$ miles to a small peninsular point, at S.W. $\frac{1}{2}$ W. nearly 1 mile from which is a rocky patch, covered at high water, named the Butts, having an iron beacon with a square sheet-iron vane.

GARDEN ISLE and RIVULET.—Between the small peninsula just noticed, and a point at W. by N. $\frac{3}{4}$ N. $2\frac{1}{2}$ miles from it, and half a mile south-eastward of Cygnet point, is a bight 2 miles wide and $1\frac{1}{3}$ miles deep, having in its centre Garden isle, which is three-quarters of a mile long, North and South, and one-third of a mile broad. This island gives the name to a rivulet flowing into the bight at half a mile to the north-eastward of the north point of the island; there is a small cove at 1 mile to the westward of the rivulet.

CYGNET POINT is a broad projection between a small cove on its south-east side and Abel bay on its north-west side, and forms the south-eastern point of the entrance of Port Cygnet. Abel bay, which is little more than a quarter of a mile in extent, is the south-east extreme of Port Cygnet.

PORT CYGNET.—WELSH.—Port Cygnet is $1\frac{1}{2}$ miles wide at its entrance from Cygnet point N.W. by W. $\frac{1}{2}$ W. to Beaupré point, and extends from its entrance 4 miles to the northward. The eastern shore

of the port is broken and irregular, consisting of points and bights. Deep bay, the southernmost and largest of these bights, lies between 1 and 2 miles northward of Cygnet point, and extends nearly three-quarters of a mile in a north-east direction. On the north side of a projecting point of Welsh, at 1 mile northward of the north point of Deep bay, is an inlet a quarter of a mile wide, extending about double that distance to the eastward. This inlet is separated from a similar one at the head of the port by two projecting points.

LYMINGTON.—LOVETT.—The western shore of Port Cygnet from Beaupré point, trends N.N.E. $\frac{3}{4}$ E. $1\frac{1}{2}$ miles to a point projecting from Lymington, between which and another point at N. $\frac{3}{4}$ W. three-quarters of a mile from it, is a bay two-thirds of a mile deep, with $3\frac{1}{2}$ fathoms water in its centre. The western bight of this bay has a sandy beach, to the northward of which is a small inlet. From the north point of the bay of Lymington the western shore of Port Cygnet extends N. by W. $\frac{1}{4}$ W. $1\frac{3}{4}$ miles to Lovett, at the north extreme of the port, where it forms a narrow shallow inlet.

Each of the five bights just described receives a small stream flowing from the neighbouring hills, of which hills mount Cygnet, N.E. $\frac{1}{2}$ N. $4\frac{3}{4}$ miles, and mount Morrison, N. $\frac{1}{2}$ E. $5\frac{1}{2}$ miles from Cygnet point, appear most worthy of notice; but mount Grey, N.N.W. $3\frac{1}{2}$ miles from mount Morrison, seems the most elevated, as it is 2,713 feet high.

The shores from Port Cygnet are a little elevated, and generally steep; their declivity is gentle, and the remarkable fertility of the soil offers everywhere the most enchanting and varied appearance. In several places natural quays are formed, easy of access for the largest vessels, or even for the purpose of careening. The middle of the harbour has from $3\frac{1}{2}$ to 7 fathoms water, upon a mud and sandy bottom; and with the exception of the interior of some of the bays, a depth of less than 3 to 4 fathoms is seldom found at a musket-shot's distance. The only river of any importance found by the French navigators, and that appeared to them to possess fresh water all the year, was Fleurieu river, but its opening was marshy and obstructed by a bank of sand, which obstructed its approach. It appeared, however, probable that streams might have been found in some of the bays which border upon the entrance of this port, for in this district there is a great number of ravines, and it is likely that some of them are the beds of permanent rivulets.*

Between Beaupré point and Poverty point, at one-third of a mile to the north-westward of it, is a small cove, from whence the north-eastern shore of Huon river trends N.W. by W. $\frac{3}{4}$ W. 2 miles to a small stream, with a

* Freycinet, Terr. Aust., p. 34.

rock close off it, and from thence W. by N. $1\frac{3}{4}$ miles to One Tree point, at Brabazon ; midway between the small stream just noticed, and One Tree point is Petchey bay, which is barely a quarter of a mile in extent.

CALIFORNIA BAY.—From One Tree point Huon river takes a N. $\frac{3}{4}$ E. direction for nearly 10 miles, with an average width of half a mile. Its eastern shore from One Tree point to California bay, at 5 miles to the northward of the point, is irregular, and is intersected by several small streams ; but for the next 5 miles it is nearly straight.

HOSPITAL and CASTLE FORBES BAYS.—The western shore of Huon river from Flight bay to abreast of California bay, consists of points and bights, the two largest of the latter being Hospital and Castle Forbes bays. Hospital bay, which lies N. by W. $\frac{1}{2}$ W. $1\frac{1}{2}$ miles from One Tree point, is two-thirds of a mile wide, N. by E. and S. by W., at the entrance, from whence it trends nearly 1 mile to the westward, with a small inlet in its S.W. corner. The bight of the bay is mostly occupied by an islet and shoal water. From the northern point of Hospital bay the shore trends N.N.W. $\frac{1}{2}$ W. $1\frac{1}{4}$ miles, and N.E. $\frac{1}{2}$ N. the same distance, to Bullock point, the intermediate bight being Castle Forbes bay, between which and Bullock point is a smaller bay.

FRANKLIN.—EGG ISLES.—For about 6 miles above Bullock point the western shore, which is nearly straight, forms the water frontage of Franklin. There are 10 to $4\frac{1}{4}$ fathoms water between One Tree and Bullock points, but from nearly abreast of, to 5 miles above the latter point, the river is mostly filled by the Egg isles.

VICTORIA.—At 6 miles above Bullock point Huon river turns N.W. $\frac{1}{2}$ N. 2 miles to Victoria, from whence, after being joined by a small stream from the north-eastward, it becomes a mere rivulet, flowing from the westward.

THREE HUTS POINT.—GORDON.—ARCH ISLET.—The western shore of D'Entrecasteaux channel from the eastern entrance point of Huon river, after turning three-quarters of a mile to the north-eastward, trends nearly East 2 miles, and then again turns north-eastward $1\frac{1}{2}$ miles to Three Huts point, behind which is Gordon. Arch islet is a perforated rock at E. by N. $\frac{1}{2}$ N. $1\frac{1}{2}$ miles from Huon isle, and half a mile from the shore. There are $3\frac{1}{2}$ to $4\frac{1}{2}$ fathoms water close along shore, for about $1\frac{1}{2}$ miles south-westward from Three Huts point.

MOUNT ROYAL, W.S.W. three-quarters of a mile from Three Huts point, is an elevated part of Gordon, rising to the height of 1,149 feet, and forms the southern end of a mountain range extending 17 miles in a N. by W. direction.

LONG BAY BANK.—From Three Huts point the coast trends N. $\frac{1}{4}$ E. $2\frac{1}{2}$ miles to Whale-boat rock, above water, and from thence N. by W. $\frac{1}{4}$ W. 2 miles to Fluerty point, at half a mile to the southward of which is Flower-pot rock, close to the shore. On the north side of Three Huts point is a shoal bight about a quarter of a mile wide, from whence the coast curves N. by E. $1\frac{1}{2}$ miles. A bank borders the coast, between Three Huts and Fluerty points, and extends two-thirds of a mile to a quarter of a mile from the shore, projecting farthest from the land at 1 mile northward of Three Huts point. Four large beacons have been erected, in 9 feet water, on the most prominent parts of this bank; and it may be easily avoided by knowing its general trend, which appears to sweep uniformly round from Three Huts point to Fluerty point. The channel between this bank and Simpson point is about 1 mile wide, with 7 and 8 fathoms in the fairway and on the east side.

CURRENT.—The prevailing current in this channel sets in a northerly direction 1 to 2 knots, according to the wind.

From Fluerty point to the north-east point of Oyster cove, at N. $\frac{1}{2}$ E. $4\frac{3}{4}$ miles from it, the western coast of D'Entrecasteaux channel is embayed to the depth of a mile, and consists of alternate bays and points, nearly each of the bays having a small stream flowing into it.

BIRCH, PEPPERMINT, TRIAL, and FLIGHT BAYS.—Birch bay, the southernmost and widest of these bays, extends from Fluerty point N.N.W. $\frac{1}{2}$ W. $1\frac{1}{4}$ miles, and is one-third of a mile deep. Peppermint bay forms a double bight, extending N. by W. 1 mile from the northern point of Birch bay. Between the north point of Peppermint bay and another projection at N. by E. $\frac{1}{2}$ E. nearly $1\frac{1}{2}$ miles from it, there are three bights, the second and third of which from the southward, are Trial and Flight bays.

LITTLE and OYSTER COVES lie between the north-east point of Flight bay and a projecting point at N.N.E. $\frac{3}{4}$ E. $1\frac{3}{4}$ miles from it, and are separated from each other by a broad projection of the coast. Little cove is one-third of a mile across at the entrance, and half a mile deep, and Oyster Cove is double that width and depth.

NORTH-WEST BAY.—MARGATE.—From the north-east point of Oyster cove the coast extends N. $\frac{3}{4}$ E. $1\frac{3}{4}$ miles to Snug point, the southern side of the entrance of North-west bay, which is nearly $1\frac{1}{2}$ miles wide, S. by W. $\frac{1}{2}$ W. and N. by E. $\frac{1}{2}$ E. : there are $3\frac{1}{2}$ fathoms close to Snug point, and 10 to 15 fathoms from thence across the entrance, to the opposite point. The two entrance points are high and rocky; but the shores of the bay are much lower, and easy of access. Within its entrance North-west bay extends 4 miles North and South, and 2 miles from its entrance to its western shore. The southern shore from Snug point, trends W. $\frac{1}{2}$ N. 2 miles to Snug cove, at three-quarters of a mile to the

rock close off it, and from thence W. by N. $1\frac{3}{4}$ miles to One Tree point, at Brabazon ; midway between the small stream just noticed, and One Tree point is Petchey bay, which is barely a quarter of a mile in extent.

CALIFORNIA BAY.—From One Tree point Huon river takes a N. $\frac{3}{4}$ E. direction for nearly 10 miles, with an average width of half a mile. Its eastern shore from One Tree point to California bay, at 5 miles to the northward of the point, is irregular, and is intersected by several small streams ; but for the next 5 miles it is nearly straight.

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FRANKLIN.—EGG ISLES.—For about 6 miles above Bullock point the western shore, which is nearly straight, forms the water frontage of Franklin. There are 10 to $4\frac{1}{4}$ fathoms water between One Tree and Bullock points, but from nearly abreast of, to 5 miles above the latter point, the river is mostly filled by the Egg isles.

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THREE HUTS POINT.—GORDON.—ARCH ISLET.—The western shore of D'Entrecasteaux channel from the eastern entrance point of Huon river, after turning three-quarters of a mile to the north-eastward, trends nearly East 2 miles, and then again turns north-eastward $1\frac{1}{2}$ miles to Three Huts point, behind which is Gordon. Arch islet is a perforated rock at E. by N. $\frac{1}{2}$ N. $1\frac{1}{2}$ miles from Huon isle, and half a mile from the shore. There are $3\frac{1}{2}$ to $4\frac{1}{2}$ fathoms water close along shore, for about $1\frac{1}{2}$ miles south-westward from Three Huts point.

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LONG BAY BANK.—From Three Huts point the coast trends N. $\frac{1}{4}$ E. $2\frac{1}{2}$ miles to Whale-boat rock, above water, and from thence N. by W. $\frac{1}{4}$ W. 2 miles to Fluerty point, at half a mile to the southward of which is Flower-pot rock, close to the shore. On the north side of Three Huts point is a shoal bight about a quarter of a mile wide, from whence the coast curves N. by E. $1\frac{1}{2}$ miles. A bank borders the coast, between Three Huts and Fluerty points, and extends two-thirds of a mile to a quarter of a mile from the shore, projecting farthest from the land at 1 mile northward of Three Huts point. Four large beacons have been erected, in 9 feet water, on the most prominent parts of this bank; and it may be easily avoided by knowing its general trend, which appears to sweep uniformly round from Three Huts point to Fluerty point. The channel between this bank and Simpson point is about 1 mile wide, with 7 and 8 fathoms in the fairway and on the east side.

CURRENT.—The prevailing current in this channel sets in a northerly direction 1 to 2 knots, according to the wind.

From Fluerty point to the north-east point of Oyster cove, at N. $\frac{1}{2}$ E. $4\frac{3}{4}$ miles from it, the western coast of D'Entrecasteaux channel is embayed to the depth of a mile, and consists of alternate bays and points, nearly each of the bays having a small stream flowing into it.

BIRCH, PEPPERMINT, TRIAL, and FLIGHT BAYS.—Birch bay, the southernmost and widest of these bays, extends from Fluerty point N.N.W. $\frac{1}{2}$ W. $1\frac{1}{4}$ miles, and is one-third of a mile deep. Peppermint bay forms a double bight, extending N. by W. 1 mile from the northern point of Birch bay. Between the north point of Peppermint bay and another projection at N. by E. $\frac{1}{2}$ E. nearly $1\frac{1}{2}$ miles from it, there are three bights, the second and third of which from the southward, are Trial and Flight bays.

LITTLE and OYSTER COVES lie between the north-east point of Flight bay and a projecting point at N.N.E. $\frac{3}{4}$ E. $1\frac{3}{4}$ miles from it, and are separated from each other by a broad projection of the coast. Little cove is one-third of a mile across at the entrance, and half a mile deep, and Oyster Cove is double that width and depth.

NORTH-WEST BAY.—MARGATE.—From the north-east point of Oyster cove the coast extends N. $\frac{3}{4}$ E. $1\frac{3}{4}$ miles to Snug point, the southern side of the entrance of North-west bay, which is nearly $1\frac{1}{2}$ miles wide, S. by W. $\frac{1}{2}$ W. and N. by E. $\frac{1}{2}$ E. : there are $3\frac{1}{2}$ fathoms close to Snug point, and 10 to 15 fathoms from thence across the entrance, to the opposite point. The two entrance points are high and rocky; but the shores of the bay are much lower, and easy of access. Within its entrance North-west bay extends 4 miles North and South, and 2 miles from its entrance to its western shore. The southern shore from Snug point, trends W. $\frac{1}{2}$ N. 2 miles to Snug cove, at three-quarters of a mile to the

northward of which is Snug rivulet, from whence the western shore extends N. $\frac{1}{2}$ E. $2\frac{1}{4}$ miles to the eastern point of Margate, between which and the north corner of the bay, at one mile to the northward of it, is a shoal bight, with North-west rivulet flowing into it. From the north corner of North-west bay its north-eastern shore trends nearly S.E. by S. $3\frac{1}{4}$ miles to the northern entrance point. The shores of the bay may be approached within a quarter of a mile in $3\frac{1}{2}$ fathoms to 8 fathoms water.

MOUNT LOUIS.—SIGNAL STATION.—POINT PIERSON.—From the northern entrance point of North-west bay the coast turns N.E. by E. 1 mile to point Pierson, which forms the north-west side of the northern entrance of D'Entrecasteaux channel. At half a mile to the north-westward of point Pierson mount Louis rises to the height of 683 feet.

There is a signal station on mount Louis, communicating with mount Nelson, at $7\frac{1}{2}$ miles farther to the northward, and $2\frac{1}{2}$ miles southward of Hobart Town, which communicates by electric telegraph, all necessary information from the entrance of Derwent river. Another line of telegraph extends easterly from mount Nelson to Port Arthur and Fortescue bay, by which the approach of vessels from as far North as Maria island, and South as cape Pillar is made known.

ISTHMUS BAY.—The entrance of this bay extends from Simpson point N.E. $\frac{1}{2}$ E. $2\frac{1}{4}$ miles, and the bay is 3 miles deep ; its western shore from Simpson point, trends S. by E. $\frac{3}{4}$ E. $3\frac{1}{2}$ miles to a small inlet having an islet in it, from whence the south-eastern shore, which is bordered by shoal flats, curves nearly 4 miles in a N.N.E. direction to a small projecting point, with a similar one at a quarter of a mile to the northward of it. The south-eastern shore of this bay is only separated from Adventure bay, on the east side of Bruny island, by an isthmus, which for a distance of 2 miles, is but 1 to 2 cables broad, nearly dividing the island midway between its northern and southern ends. On the north side of the northern of the two small projecting points just noticed, is a cove half a mile wide, from whence the eastern shore of Isthmus bay trends N.W. by W. three-quarters of a mile to a point which separates this from Great bay, to the northward.

GREAT BAY is 2 miles wide, N. by W. $\frac{3}{4}$ W. and S. by E. $\frac{3}{4}$ E. at its entrance, and is nearly $2\frac{1}{4}$ miles deep ; at one mile within its entrance the bay is contracted to $1\frac{1}{4}$ miles in width by projections of the northern and southern shores, within which it again expands to nearly $2\frac{1}{2}$ miles, North and South. There is a small cove on either side of a broad projecting part of the southern shore, and there is an inlet in the north-eastern extreme of the bay, with apparently a narrow channel into it through the flats which border the eastern shore.

MISSIONARY BAY.—From Stockyard point—a double projection which separates Great bay from Missionary bay, to the north-westward of it—the entrance of the latter bay extends W. $\frac{1}{2}$ S. $1\frac{1}{2}$ miles to Soldiers point, from whence the bay runs in about one mile to the north-eastward.

SNAKE ISLET.—Between Soldier point, the western extreme of Missionary bay, and a narrow point between two small coves, at W. by N. $\frac{1}{2}$ N. one mile from it, is a bay one mile deep, in the inner part of which is Snake islet. From the western point of this bay the coast turns N.N.W. half a mile to Kinghorn point, and from thence N.N.E. $\frac{1}{4}$ E. half a mile to the south-eastern point of Apollo bay, which extends from thence N.N.W. three-quarters of a mile to Roberts point, and is half a mile deep. The channel between Apollo and Peppermint bays is $1\frac{1}{4}$ miles wide, with $5\frac{1}{2}$ to 10 fathoms water close to the eastern shore, and 11 fathoms in the fairway.

BARNES BAY.—From Roberts point the coast trends N.E. $\frac{1}{4}$ E. $1\frac{1}{2}$ miles to the south-western entrance point of Barnes bay, which is half a mile wide, N.E. and S.W., at the entrance, from whence it runs in 2 miles to the north-eastward. At half a mile south-eastward of the south-western entrance point of the bay is Syces cove, which is half a mile wide at the entrance, from whence it trends S.E. three-quarters of a mile towards the bight of Missionary bay. From the eastern point of the cove the south-eastern shore of Barnes bay extends N.E. nearly $1\frac{1}{4}$ miles, to a point, between which and a projection of the northern shore, the bay is contracted to a channel one-third of a mile wide, leading into Simmond bay, the inner part of Barnes bay, which extends $1\frac{3}{4}$ miles North and South, forming two narrow bights, one trending to the northward and the other to the southward.

PETCHY COVE, which lies between the north-eastern entrance point of Barnes bay and another point at N.W. by W. from it, is half a mile wide at the entrance, from whence it runs in three-quarters of a mile to the N.N.E.

NORTHERN ENTRANCE of D'ENTRECASTEAUX CHANNEL.—From Woodcutters point, which lies N.N.W. $\frac{1}{2}$ W. two-thirds of a mile from the north-west point of Petchy cove, the coast, after turning half a mile to the eastward, trends nearly North $1\frac{1}{2}$ miles to Bligh point, from whence it curves $1\frac{3}{4}$ miles in a N.N.E. $\frac{1}{2}$ E. direction to Kelly point, which forms the south-east side of the northern entrance of D'Entrecasteaux channel, and is the north-west point of cape Delasorte, the north end of Bruny island. This entrance, which is half a mile wide, has 3 fathoms close to point Pierson, and 6 and 7 fathoms in the fairway.

The navigation of D'Entrecasteaux channel is not difficult either by day or night, if provided with the Admiralty chart, the principal dangers being

the Actæon reefs, Zuidpool rock, and the bank which borders the western shore between Three Huts and Fluerty points. In passing the valleys and mountains, strong gusts and contrary winds are met with, and a moment afterwards it falls quite calm, an inconvenience common to lands of this description. At the various anchorages much trouble is found in weighing the anchor, in consequence of the tenacity of the muddy bottom which everywhere exists.

Captain J. Welsh, who surveyed the south part of D'Entrecasteaux channel in 1825, says :—" This channel, which affords at once the safest shelter for shipping, perhaps in the world, is not to be recommended as a passage for ships bound to Hobart Town, except in the summer season, when dependence may be placed on the sea breeze, as the following observations will demonstrate.

" In making the land from the westward, ships have frequently taken this passage, as affording immediate anchorage, secure from all winds ; but they are likely to be detained several days before they can reach Hobart Town. The detention is caused by the direction given to the wind, even when it blows strong at sea from the S.W., by the very high hills and deep openings that form the western coast of the channel ; such as South port, Port Esperance, Huon river, and the opening to the river above Garden isle, each of which gives a respective or distinct course to the wind.

" Experience proves that the passage to Hobart Town by Storm bay is preferable. I have, in several voyages to this colony, found great advantage by taking this route, and strongly recommend all commanders to follow it."

DIRECTIONS.—In proceeding through D'Entrecasteaux channel for Hobart Town, a vessel from the westward, unless a pilot has been received on board, is recommended in no case to pass between the Actæon reefs and the western shore ; but having arrived abreast of Whale head, she is to bring that head to bear S.W. by W., and not to the southward of that bearing before the light-house on cape Bruny bears N. by E. $\frac{3}{4}$ E., at which time the S.E. Break of the Actæon reefs will bear W. by N. distant $2\frac{3}{4}$ miles, and the reefs must not be approached nearer, unless the vessel be in charge of a pilot ; from that position steer N. by W. 11 miles, or till the opening between Partridge isle and the point to the southward of it bears East : this course will keep the vessel in mid-channel and free from all dangers.

In baffling or contrary winds, vessels should keep on the eastern shore, which may be approached boldly. Several reefs and rocks being on the western shore higher up than the Actæon reefs, it will be necessary to approach that shore with great caution, until South port opens out, and the light on cape Bruny is brought to bear E. $\frac{1}{2}$ S.

Vessels working in the channel must be careful to keep the lead going, and not approach the Actæon reefs to less than a depth of 20 fathoms; with Sterile isle bearing anywhere between N.W. by N. and N. $\frac{1}{2}$ E., these reefs must not be approached to 6 fathoms, as a vessel would be on them before another cast of the lead. After having passed South port, the shore on either side may be approached to half a mile.*

From abreast of the south end of Partridge isle steer N.E. by N. 12 miles to abreast of Three Huts point, going between Zuidpool rock and Satellite isle, keeping a good look out for the rock. After passing Three Hut point borrow towards Simpson point, to avoid the bank which borders the shore between Three Huts and Fluerty points, and then proceed northward in the fairway through the remaining portion of the channel.

BRUNY ISLAND, of which the southern and western coasts have been already described as the northern and eastern shores of D'Entrecasteaux channel, is 27 miles long from Tasman head N. $\frac{1}{2}$ W. to cape Delasorte, and is 9 miles across at its southern and broadest part. A ridge of hills extends along the eastern side of the island, from Tasman head to Simpson point. At nearly midway between the north and south ends of the island it is nearly divided by the long isthmus, before described, between Isthmus and Adventure bays.

THE EASTERN COAST of Bruny island from Tasman head, trends N.E. $1\frac{1}{2}$ miles to a projecting point, from which it extends N. $\frac{1}{2}$ W. 4 miles, and then turns S.E. half a mile to a double point, half a mile broad, close to the southward of which is Arched islet; a narrow reef borders the shore between 1 and $1\frac{3}{4}$ miles south-westward of Arched islet. Between the double point and cape Connella, at N. by E. $\frac{1}{2}$ E. 3 miles from it, the coast is embayed to the extent of three-quarters of a mile. There is a sunken rock in the south-western part of this bight, and two small islets lie near the shore at three-quarters of a mile and $1\frac{1}{4}$ miles to the south-westward of the cape.

FLUTED CAPE.—From cape Connella the coast trends N. $\frac{3}{4}$ W. $1\frac{1}{2}$ miles to Fluted cape, and from thence N.W. by W. $1\frac{1}{4}$ miles to the north point of Cookville, close off which is Penguin islet. Fluted cape is high and steep, is composed of basaltic columns, and is covered with trees. Penguin islet is of moderate height, and is also covered with trees. There are 22 fathoms water at a quarter of a mile from the shore between the cape and the island.

ADVENTURE BAY extends from Penguin isle N. by E. 6 miles to cape Frederick Henry, and is 3 miles deep. From Penguin isle the shore

* Nautical Magazine, 1838, p. 635.

first trends S.W. by S. $1\frac{1}{2}$ miles, and then curves $1\frac{3}{4}$ miles in a N.W. $\frac{3}{4}$ W. direction, forming a bight with 7 to 3 fathoms water, and some fresh water rivulets flowing into it. From the western point of this bight a rocky shore sweeps round N. by W. $2\frac{1}{4}$ miles to a sandy beach extending N.N.E. $\frac{3}{4}$ E. $5\frac{1}{4}$ miles; this beach, which is slightly curved, forms the south-east side of the long isthmus between Isthmus and Adventure bays: a lagoon extends behind the beach for more than a mile from its north-east end. Between this beach and cape Frederick Henry, at E.S.E. one mile from it, is a small exposed bight.

Wood and Water.—There are 10 to 7 fathoms close to Penguin isle, and 21 fathoms at $3\frac{1}{2}$ miles to the northward of it, with decreasing depths towards the south-western shore, close along which there are 9 to 12 fathoms water. This bay is well sheltered from south-west and westerly winds, and it abounds with wood and water; but they are difficult to be obtained on account of the heavy surf which generally breaks upon the beach.

CAPE FREDERICK HENRY.—VARIETY and TRUMPETER BAYS.—From this cape, which has a rock close off it, the coast extends N. $\frac{1}{4}$ W. 3 miles to a projection, between which and some rocks near the shore at N.W. $\frac{1}{2}$ N. $1\frac{1}{4}$ miles from it, is Variety bay, but it is barely a quarter of a mile deep. From these rocks the coast trends N.W. by N. one mile to the south-east point of Trumpeter bay, which is three-quarters of a mile wide N.W. and S.E., and is half a mile deep: there is a rock above water close to the southern shore of the bay, with which it is connected by a reef.

YELLOW BLUFF.—ONE TREE POINT.—From the north-west point of Trumpeter bay an irregular coast trends N. $\frac{1}{2}$ E. one mile to Yellow bluff, and from thence nearly in a direct line, N.N.W. $2\frac{1}{4}$ miles to One Tree point.

KELLY AND BULL BAYS.—Between One Tree point and the east point of cape Delasorte, at N.W. $\frac{1}{4}$ N. $2\frac{1}{2}$ miles from it, are Kelly and Bull bays, separated from each other by a broad rocky point: there are 7 to 2 fathoms within a quarter of a mile of the shores of these bays, but they are mostly bordered with rocks. From the east point of cape Delasorte, its north-eastern shore trends W.N.W. nearly one mile to Kelly point, and is bordered with rocks, outside which, at about one-third of a mile to the north-eastward of Kelly point, there are 9 feet water.

DERWENT RIVER.—The entrance of this river has conspicuous marks, mount Louis, the conical hill 683 feet high, with the signal station, on the west side; and on the east side, Iron Pot islet, with its light-house, and Betsy isle, bearing E. by N. $\frac{1}{2}$ N., the former distant 3, and the latter 6 miles from Kelly point, the north extreme of cape Delasorte.

IRON POT LIGHT.—This light-house, which stands on a small islet at half a mile southward of cape Direction, is a square tower 40 feet high, with its upper part painted *red*, and its lower part *white*, and exhibits a *white* fixed light at the height of 65 feet above the sea; visible in clear weather, at the distance of 10 or 12 miles. The channel between the light-house and cape Direction is rocky, only leaving a passage barely half a mile wide, for small vessels.

The entrance of Derwent river between the east point of cape Delasorte and Iron Pot light-house, is $2\frac{1}{4}$ miles wide, with depths of 10 to 8 fathoms, sand and broken shells. From thence the river retains an average width of about $2\frac{1}{2}$ miles for the distance of 12 miles to Hobart Town, the soundings in mid-channel increasing to 20 fathoms at 6 miles above the entrance, and from this depth decreasing to 12 fathoms close to the town. There are generally 10 to 12 fathoms within half a mile of, and at least 3 fathoms at a quarter of a mile from either shore.

BLACKMAN BAY.—The western shore of Derwent river from point Pierson, trends N.N.W. 3 miles to the southern point of Blackman bay, close off which are some dry and covered rocks. This bay extends half a mile North and South, and is a quarter of a mile deep, with 6 fathoms close off its entrance, and 6 feet near the shore.

KINGSTON.—BROWN RIVER.—From Blackman bay the shore trends North two-thirds of a mile to the south point of the bay of Kingston, which from thence extends North one mile, and is half a mile deep, with 12 to 9 fathoms in the entrance, and 9 to 6 feet near the shore. Brown river flows into this bay, at one-third of a mile within its north point.

ALUM CLIFFS.—CRAYFISH POINT.—From the north point of the bay of Kingston the rocky shore trends irregularly N. by E. $\frac{1}{2}$ E. half a mile to the south-western point of the bay of Alum cliffs, which extends from thence N.N.E. about one mile to Crayfish point. It forms a double bight, a quarter of a mile to one-third of a mile deep, with 7 to 4 fathoms across its entrance, and 3 to $3\frac{1}{2}$ fathoms at one cable's length from the shore, which is partly bordered by rocks. These Alum cliffs are most conspicuous, showing their precipitous faces for the distance of a mile.

From Crayfish point the rocky shore extends North $1\frac{3}{4}$ miles, when a succession of rocky points and small beaches trends N. by W. $\frac{1}{2}$ W. about half a mile to Dead Tree point, a rocky projection between which and Sandy Bay point, at N.W. by N. one-third of a mile from it, is a smooth beach.

∴ The shore from point Pierson to Sandy Bay point, although rocky, is bold to approach, there being generally at least 5 fathoms water at a quarter of a mile from the shore, except off Dead Tree point, where there are 5 fathoms nearly one-third of a mile from the point.

MOUNT NELSON.—SIGNAL STATION.—From Sharp hill, at three-quarters of a mile northward of Brown river, a range of forest hills extends in a N. $\frac{1}{2}$ E. direction $2\frac{1}{2}$ miles to mount Nelson, which is 1,191 feet high, and has a telegraph station on it, which communicates with mount Louis and Hobart Town, Marryat's as well as local signals being used. Gentle slopes and spurs descend from this range to the shore from the Alum cliffs to Sandy Bay point.*

SANDY BAY POINT is the north-eastern extreme of low flat land projecting about a quarter of a mile from the more elevated, well-wooded, and partly cultivated land which descends from mount Nelson.

SANDY BAY extends from Sandy Bay point N.W. $\frac{1}{4}$ W. $1\frac{1}{2}$ miles to Battery point, the south-east extreme of Hobart Town; a smooth beach trends 4 cables' lengths westward from Sandy Bay point to a rocky head, from whence the shore, consisting of rocky points and sandy beaches, extends nearly W.N.W. half a mile to Dunkley point, which projects $1\frac{1}{2}$ cables' lengths from the line of coast, its outer part being closely fringed with dry and covered rocks, with 6 to 15 feet water close to them. From the inner part of Dunkley point the shore trends N.W. by W. 3 cables' lengths to a small stream, and from thence turns N. by E. one-third of a mile to Wellington rivulet, at one cable's length to the southward of which are some bath-houses. From Wellington rivulet the south-eastern water frontage of Hobart Town, with its patent slips and jetties, trends N.E. $\frac{1}{2}$ N. 3 cables' length to Battery point, and from thence nearly N.N.W. a quarter of a mile to the southern point of the entrance of Sullivan cove, the principal anchorage of Hobart Town.

Ridges of well-wooded and partly cultivated land descend from mount Nelson to the shore between Dead Tree point and Hobart Town, with several small streams flowing into the bay. A road from the southward to Hobart Town, passes by the villages and houses which are situated near the shore of Sandy bay.

From 100 yards to a quarter of a mile north-westward of Sandy Bay point there are 5 to 10 fathoms water, with uniform soundings in 12 fathoms, from thence to 1 cable's length off Battery point. The shore of Sandy bay may be approached to $1\frac{1}{2}$ cables' lengths in 5 fathoms, and to 1 south-cable's length in 3 fathoms, except at one-third of a mile south-eastward of Dunkley point and at a quarter of a mile southward of Battery point, where the 3-fathoms edge of the bank which borders the bay, projects $1\frac{1}{2}$ cables' lengths, and the 5-fathoms edge nearly a quarter of a mile from the shore. But Dunkley point may be approached from the eastward to 150 yards, and from the northward to 50 yards, in 5 fathoms, and to about

* See Plan of the Port of Hobart Town, No. 105; scale, $\text{m} = 10$ inches.

two-thirds of those distances in 3 fathoms. A detached bank, about one cable's length in extent, with $3\frac{1}{2}$ to 5 fathoms water on it, lies N.W. by W. 4 cables' lengths from Sandy Bay point; with this exception the depth of water gradually decreases towards the shore.

CAPE DIRECTION is the south point of the South arm, a peninsula only one mile to a quarter of a mile broad, extending from the cape N. by W. $\frac{1}{2}$ W. $5\frac{1}{3}$ miles to Jane point, which forms the south side of the entrance of Ralph bay. This peninsula is mostly covered with open forest; the land for about $1\frac{1}{2}$ miles northward of cape Deliverance, and between $1\frac{1}{2}$ and $2\frac{1}{2}$ miles southward of Jane point, being elevated, and rising to two hills near the cape, and to another hill 400 feet high, at S. by E. $\frac{1}{2}$ E. 2 miles from Jane point; the remaining portion of the arm consists of undulating hills, with low narrow flats between the more elevated land.

THE EASTERN SHORE of Derwent river, which is partly formed by the South arm, extends from cape Direction N.W. one mile to the southern point of Half Moon bay, and forms three bights, the north westernmost and largest of which has 3 fathoms water; but the southern point of the bay and the projecting point between it and cape Deliverance have only 12 feet water at 2 cables' length off them.

HALF MOON BAY extends $1\frac{3}{4}$ miles, N. by W. $\frac{1}{2}$ W. and S. by E. $\frac{1}{2}$ E., and is three-quarters of a mile deep, with 5 and 6 fathoms water in the middle of it, and 1 to 4 fathoms close along shore.

From the north point of Half Moon bay the shore trends N. $\frac{1}{2}$ W. 1 mile to the southern point of Opossum bay, close to the southward of which is a small cove with 2 fathoms water in it. At half a mile north-westward of the northern point of Half Moon bay is a 4-fathoms bank at a quarter of a mile off shore, with 5 fathoms inside it.

OPOSSUM BAY is three-quarters of a mile wide, from S.S.E. to N.N.W., and is half a mile deep, with 6 to 2 fathoms water. This bay is separated from a bight to the northward of it by a broad hilly point, partly fringed with dry and covered rocks, from whence the bight extends N.N.E. $\frac{1}{2}$ E. three-quarters of a mile to Jane point, and has 3 fathoms in it; but its shore is rocky.

TRYWORK POINT.—At $1\frac{1}{2}$ miles to the northward of Jane point, Trywork point and the rocky shore, extending half a mile to the eastward from it, form the north side of the entrance of Ralph bay, and the south end of what may be termed the North arm, as it separates the northern part of the bay from Derwent river. This arm, which is 2 miles long, North and South, and three-quarters of a mile to half a mile broad, consists of a series of undulating grassy hills, with patches of cultivation.

From Trywork point the eastern shore of Derwent river curves North $1\frac{1}{4}$ miles, and from thence N. by W. $\frac{1}{2}$ W. $1\frac{2}{3}$ miles to a projection of the shore, between which and Kangaroo bluff, at $1\frac{2}{3}$ miles to the westward of it, are two small bays, of equal size, separated from each other by a broad rocky point, at the foot of a hill close to the northward of it. The shore from Trywork point to Kangaroo bluff, although rocky, has 2 to 6 fathoms water at about a cables' length from it, and it may be approached within one-third of a mile in 12 fathoms.

KANGAROO BLUFF is the cliffy south point of an elevated peninsula, extending N.N.W. half a mile to Bellerive pier, at 1 cable's length to the eastward of which is Dawson's wharf: from the bluff the western shore sweeps round in a N.W. and North direction to the pier, and although rocky, it may be approached within 100 yards in 3 fathoms water.

KANGAROO BAY lies between Kangaroo bluff and Montagu point, at W.N.W. three-quarters of a mile from it; from $1\frac{1}{2}$ cables lengths W.N.W. of the bluff to the same distance E.S.E. from the point there are 7 to 10 fathoms water in the entrance, from whence the bay trends three-quarters of a mile in a N.E. direction, gradually decreasing to 1 cable in width between Bellerive pier and a low point projecting a cable's length from the opposite shore. From Montagu point the north-west shore of Kangaroo bay, for about half a mile, may be approached to 50 yards in 3 fathoms, but from thence the edge of the northern bank trends eastward to 50 yards North of Bellerive pier. Above the pier the bay expands to 2 cables in width, but it is filled by a flat, on which the greatest depth of water is only 15 feet. From 7 fathoms in the entrance the depth of water decreases to 4 fathoms at about 50 yards N.W. of the pier.

MONTAGU POINT, which has 8 fathoms water within 150 yards of it, is the south-west extreme of a hilly wooded promontory projecting three-quarters of a mile from the north-eastward, its most elevated part being a hill 316 feet high, at N.N.E. $\frac{1}{2}$ E. half a mile from the point.

MONTAGU BAY.—From Montagu point the shore trends N. by W. $\frac{1}{2}$ W. one-third of a mile to the southern point of the entrance of Montagu bay, which extends from thence N. by W. $\frac{1}{2}$ W. one-third of a mile. Between the south point of the entrance of the bay and a rocky spit at 2 cable's lengths to the north-eastward of it, is a shoal bight with only 12 feet water at a cable's length from the shore; but the northern shore may be approached to about 50 yards in 3 fathoms water. The bay runs in nearly one-third of a mile in a N.E. direction, terminating in a small shallow cove, on the north-western shore of which are some Smelting

works. From 7 fathoms in the entrance the depths decrease to $3\frac{1}{2}$ fathoms at 100 yards to the southward the Smelting works.

SOUNDINGS.—For about a quarter of a mile northward of Montagu point there are 11 and 12 fathoms at 150 yards from the shore ; but there are only $4\frac{1}{2}$ fathoms at that distance off the south point of Montagu bay. Between a quarter of a mile north-westward of Montagu point and $1\frac{1}{2}$ cables' lengths south-westward of the north point of Montagu bay there is a singular pool about 4 cables long and 1 cable wide, having 24 to 26 fathoms water.

ANCHORAGE will be found in any part of Derwent river, but the safest on all occasions, is on the western side, the eastern being unsafe, and particularly so for small vessels, several of which have been lost by anchoring near it.

PILOTS for Derwent river may be obtained at Recherche bay, in the southern entrance of D'Entrecasteaux channel ; also on Bruny island, at about 4 miles from the Iron Pot light-house, and at the junction of D'Entrecasteaux channel and Derwent river. The pilots for the Derwent are each provided with a whale boat, in which they board inward bound vessels in Storm bay, at a distance depending upon the weather.

DIRECTIONS.—There are two approaches to Derwent river, that from the S.W., through D'Entrecasteaux channel, and the other by Storm bay, between the northern part of Bruny island and Tasman peninsula, at about 12 miles to the eastward of it ; but the latter approach is much to be preferred, experience having taught the local traders that though apparently time and smooth water would be gained by going through D'Entrecasteaux channel, still, in consequence of the violent squalls, which suddenly rushed down the hills, preventing vessels from carrying sail, much time is actually lost ; so that in all cases the better passage to Derwent river is through Storm bay.

Vessels from the westward bound into Derwent river through Storm bay, should give Tasman head, the south point of Bruny island, a good berth, to avoid the Friar rocks. In proceeding northward past Fluted cape the most remarkable object will be mount Wellington, which resembles mount Table at the Cape of Good Hope, and in advancing up the bay, Betsy isle, which is high and wooded, will soon appear, when steer so as to pass on the west side of Iron Pot light-house. In approaching the Derwent the generally strong prevailing westerly winds make it desirable to keep within a mile of Bruny island.

Having entered Derwent river between cape Delasorte and Iron Pot light-house, keep the western shore aboard, steering N. by W. $\frac{1}{4}$ W. and N. by E. up to a quarter of a mile off Dead Tree point, after passing which

steer N.W. for Sullivan cove, the usual anchorage off Hobart Town, where vessels may come to as most convenient; but one anchor should be laid out well to the S.E. for the convenience of getting under way. There is no danger all the way up, so that vessels may work in or out without a pilot, tacking at about a quarter of a mile off shore, and may anchor anywhere, on muddy bottom.

HOBART TOWN, the capital of Tasmania, is situated on a gently sloping plain at the foot of the hills that descend from mount Wellington, which bears W. by N., distant $5\frac{1}{4}$ miles from mount Nelson, and is 4,166 feet high, with Colin Bonnet, another mountain, 4,131 feet high, at nearly 4 miles to the westward of mount Wellington. Between the mouth of Wellington rivulet and Battery point there are patent slips, wharves and jetties, with a hulk and several buoys moored off them, on the bank before noticed, the 3-fathoms edge of which extends 100 to 200 yards from the shore.

Between Battery point and the southern point of Sullivan cove, at N. by W. $\frac{3}{4}$ W. a quarter of a mile from it, the shore recedes into two small bights, in the southern of which is a patent slip, with 6 fathoms water at 30 yards off it. Midway between Battery point and the patent slip, the bank, on which several buoys are moored, projects 120 yards from the shore to the depth of $4\frac{1}{4}$ fathoms. At 1 cable's length northward of the patent slip there are 6 and 7 fathoms within 50 yards of the shore; but a spit with $3\frac{1}{2}$ fathoms on it, projects 100 yards from the southern entrance point of Sullivan cove.

FORT MULGRAVE.—SIGNAL STATION.—Fort Mulgrave, or Prince Albert battery, at which is a signal-station, is situated at about 1 cable's length to the south-westward of the southern entrance point of Sullivan cove, at an elevation of 85 feet above the sea.

SULLIVAN COVE, the principal anchorage of Hobart Town, extends from its sloping southern point N. by W. $\frac{3}{4}$ W. nearly 3 cables' lengths to the New Norfolk Steam-boat pier. From 4 fathoms at 50 yards north-eastward of the southern point, the depths increase to 10 and 9 fathoms in the middle of the entrance, and from thence decrease to 6 and 5 fathoms at 100 yards S.E. of the pier. From the middle of the entrance the cove extends about W. by S. a little more than 2 cables' lengths to the Melbourne and Sydney Steam-ship pier, on which is a *red* light for steamers. From 9 and 10 fathoms in the middle of the entrance the depths decrease to 5 and 6 fathoms within 50 yards of the shore and wharves, over a bottom of mud.

From the southern point of Sullivan cove its south shore—behind which are the Ordnance stores—trends W. $\frac{1}{2}$ N. 250 yards to New wharf,

and may be approached within 50 yards in 4 and $3\frac{1}{2}$ fathoms water. New wharf from its eastern end, extends W. $\frac{3}{4}$ S. 330 yards to the western corner of the cove : the middle portion of the wharf is accessible at low water, to vessels of the greatest draught.

From the south-west corner of Sullivan cove to New Norfolk Steam-boat pier there is a continuation of wharves from which project four piers. There are generally 5 fathoms within 50 yards of these wharves, and 10 to 15 feet close to them. The Melbourne and Sydney Steam-ship pier, close off which is moored a coal hulk, projects into 6 fathoms, and another pier at 200 yards to the north-eastward of it, into $5\frac{1}{2}$ fathoms ; at 50 yards to the northward of the latter is Kangaroo steam-pier, which extends into 26 feet water. There are three docks, or basins behind these wharves, the two largest being Constitution dock, which has an entrance at about 100 yards to the northward of Melbourne and Sydney Steam-ship pier, and a more shallow, but much larger basin to the north-eastward of it, having an entrance at about 50 yards to the northward of Kangaroo steam-pier. New Norfolk Steam-boat pier, which forms the northern point of Sullivan cove, projects about 20 yards into 6 or 8 feet water : a bank with only 15 to 18 feet water on its outer edge, extends about 100 yards southward and 50 yards eastward from the end of the pier.

Close to the northward of New Norfolk Steam-boat pier is the mouth of Hobart Town rivulet, between which and Macquarie point, at N. by E. a little more than 2 cables' lengths from the pier, there are only 12 feet water at 1 cable's length from the shore, with irregular depths of $2\frac{1}{2}$ to 5 fathoms between 1 and $1\frac{1}{2}$ cables' lengths to the north-eastward of the pier ; but Macquarie point, over which is Queen's battery, may be approached within 100 yards in 5 and 6 fathoms.

The DOMAIN.—From Macquarie point the river frontage of the Domain curves north-westward and northward nine-tenths of a mile to point Pavilion, and has a landing-place at 1 cable's length, and a patent slip at 3 cables' lengths from the former point. There are 3 fathoms water close to the landing-place ; but a flat, with $3\frac{1}{2}$ to $4\frac{1}{2}$ fathoms water, extends above 1 cable's length from it. The patent slip projects 100 yards northward into 3 fathoms water, towards two buoys moored in 4 fathoms, on a bank with $3\frac{1}{2}$ to 4 fathoms on it, extending $1\frac{1}{2}$ cables' lengths from the shore ; but to the eastward of the patent slip, and at 2 cables' lengths to the northward of it, there are 5 fathoms water within 100 yards of the shore. For about one-third of a mile southward of point Pavilion a bank, having 4 to 5 fathoms water on it, extends one-third of a mile from the shore. Between this bank and that which projects from the landing-place, to the northward of Macquarie point, there are regular depths of 6 to 9

fathoms. On the northern part of the Domain are the Government house, Observatory, and Botanical gardens.

Supplies.—Hobart Town has several public buildings and Ordnance and Commissariat stores ; there are four patent slips, one of which is capable of hauling up a ship of about 1,000 tons, and the others up to about 500 tons. Stores of all kinds and provisions, fruit, water, and fire-wood, are easily procured. The country in the immediate neighbourhood is rich in natural productions, such as coal, iron, black lead, alum, mica, precious stones, and gums.

In the vicinity of D'Entrecasteaux channel and Huon river the trees are lofty, straight and hard, and are used for the keels of the largest ships built in the colony ; they are the largest species in Australasia, of the *Eucalypti* ; other woods are used for ornamental purposes, particularly the Huon pine, which somewhat resembles satin wood.

Geographical Position.—The flag-staff at Fort Mulgrave signal station is in lat $42^{\circ} 53' 32''$ S., long. $147^{\circ} 21' 20''$ E.

RISDON FERRY.—From point Pavilion Derwent river trends north-westward 3 miles to Risdon ferry, and varies in width from 1 to one-third of a mile, with depths of 12 to 6 fathoms. The shores are bold, with several inlets, those most worthy of notice on the south-western side, being Newton and Prince of Wales bays, the former, which has $2\frac{1}{2}$ fathoms water in its entrance, is distant $1\frac{1}{2}$ miles, and the latter $2\frac{3}{4}$ miles from point Pavilion. On the north-eastern side, at three-quarters of a mile N.N.E. of the point, an inlet trends half a mile to the northward ; and at N.W. $2\frac{1}{2}$ miles from the inlet is Risdon cove, at the south point of which is the ferry.

From Risdon cove Derwent river extends north-westward $2\frac{1}{2}$ miles to a narrow point projecting 1 mile from the western shore, the intermediate portion of the river being nearly 2 miles wide, and forming an extensive bay on the south-west side. There are $5\frac{1}{2}$ to $3\frac{1}{2}$ fathoms water in mid-channel.

BRIDGEWATER.—Between the eastern shore and the point which projects from the opposite side, the river is contracted to a quarter of a mile in width, and after turning from thence about 1 mile to the westward, it trends N.W. by N. $1\frac{3}{4}$ miles to Jordan river, which flows into the Derwent from the northward. Between the mouth of the Jordan and Bridgewater, at $1\frac{3}{4}$ miles to the north-westward of it, and for about 2 miles to the westward of the bridge, the Derwent is nearly half a mile wide, above which it is much smaller, with branches flowing into it, mostly from the northward and north-westward.

MOUNT DROMEDARY.—The land on either side of Derwent river consists of hills and fertile valleys, with numerous small streams flowing

into the river. The principal summits of these ridges above Hobart Town, are mounts Direction, Faulkner, and Dromedary, which bear respectively N. by E. $\frac{3}{4}$ E. 7 miles, N.W. by N. 5 miles, and N.W. $\frac{3}{4}$ N. 13 to 16 miles from mount Wellington. Mount Direction is 1,468 feet, and mount Dromedary 3,245 feet high.

TIDES.—It is high water in Derwent river, full and change, at 8h. 15m.; springs rise $4\frac{1}{2}$ feet, and neaps $3\frac{1}{2}$ feet. The tides are here exceedingly irregular, and frequently are for days, almost stationary. The flood stream is barely perceptible between Iron Pot islet and Kelly point, but it runs stronger under mount Louis, and from thence parallel to the shore; it then follows the course of the river at the rate of half a knot. Between Macquarie and Montagu points the ebb runs South $1\frac{1}{2}$ knots at half tide; off Battery point it runs S. by E., sweeping south-eastward round Sandy bay, at the rate of three-quarters of a knot, and after passing Sandy point, its strength is gradually reduced to half a knot towards the entrance of the river.

WINDS.—During summer, or from December to March, the winds are generally land and sea breezes, which blow from N.N.W. and S.S.E., but with no degree of certainty, for frequently sudden changes take place in the middle of a fine sea breeze, by violent gales from the westward, which usually last three or four days. During winter months it blows almost one continued gale. A great quantity of rain falls during the year.

RALPH BAY, which is separated from the eastern side of Derwent river by the North and South arms already noticed, extends $7\frac{1}{2}$ miles in nearly a parallel direction with the river, and $1\frac{1}{2}$ to $3\frac{1}{2}$ miles East and West. The entrance of the bay between Jane and Trywork points, is $1\frac{1}{4}$ miles wide with 7 to 14 fathoms water, but within the entrance the water is mostly shallow. Mortimer bay is an indentation of the eastern shore of Ralph bay, between 2 and 3 miles E.S.E. of Jane point. From Maria point, the north-western extreme of Mortimer bay, the eastern shore of Ralph bay trends northward $3\frac{1}{2}$ miles to the foot of mount Mather. Between mount Mather and the north shore of Ralph bay, a creek, half a mile wide at its entrance, trends about $1\frac{1}{2}$ miles to the eastward and southward; but this and Mortimer bay are both very shallow.

HOPE BEACH forms a slight curve extending from cape Direction nearly N.E. by E. 3 miles to Goat bluff, on which there is a hillock. This beach, which is low and narrow, is the only barrier between the south shore of Ralph bay and the sea.

BETSY ISLE and ROCKS.—Betsy isle, of which the south point lies E. $\frac{1}{4}$ N. 3 miles from Iron Pot islet, is $1\frac{1}{2}$ miles long, N.W. by N. and S.E. by S., half a mile broad, and is high and wooded, but it is only accessible towards its north-western end. A spit projects from the north

extreme of the island, between which and Goat bluff are two flat rocks, with $5\frac{1}{2}$ and 6 fathoms North and South of them. At S.W. one-third of a mile from the south point of Betsy isle is a small islet, between 1 and 4 cables' lengths to the south-eastward of which is a dangerous rocky reef. There are 7 fathoms water between the southern point of Betsy isle and the islet, and also between the islet and the reef. In heavy weather, the sea breaks within half a mile of the reef, where there are 5 to 16 fathoms water. There are regular soundings in 11 to 14 fathoms water, between the entrance of Derwent river and Betsy isle, with 6 and 7 fathoms close to the sides of the island and within half a mile of Hope beach.

The coast from Goat bluff curves N.E. $\frac{1}{4}$ N. $1\frac{3}{4}$ miles to cape Contrariety, and from thence N.E. by N. 2 miles to cape Deslaco, which forms the west entrance, point of North, or Frederick Henry bay. There are 9 fathoms water at half a mile southward of the former cape.

STORM BAY, of which the western shore is formed by the coast of Bruny island, from cape Frederick Henry to the entrance of Derwent river, and the northern shore by the coast from cape Direction to cape Deslaco, is 15 miles wide E. by N. $\frac{1}{4}$ N. from cape Frederick Henry to cape Raoul, the south point of Tasman peninsula, and extends from its entrance 15 miles northward to cape Deslaco.

SOUNDINGS.—From 50 fathoms close outside some dry and covered rocks, which extend about 1 mile from cape Raoul, the depth of water across Storm bay gradually decreases towards Bruny island, over a bottom of fine red sand, with black specks and small broken shells. From 35 fathoms in the middle of Storm bay, the water shoals gradually to 25, 16, and 12 fathoms towards Betsy isle. In crossing towards the entrance of Derwent river the bottom becomes muddy, which is generally the case where there is any considerable run of fresh water.

DIRECTIONS.—Vessels from the eastward, after rounding cape Pillar and cape Raoul, should stand over towards cape Frederick Henry, and steer from thence along the north-eastern coast of Bruny island for the entrance of Derwent river. In beating against a north-west wind, work up along the same shore, to avoid the strong outset from North bay.

If, when off Betsy isle, the wind should come on to blow from the N.W., so as to prevent a vessel from working into the Derwent, she may obtain good anchorage either in Adventure bay or North bay. In calms or light winds vessels may, if necessary, anchor with a stream or kedge in Storm bay until they get a breeze.

Vessels bound to sea from Derwent river, and meeting a south-easterly gale in Storm bay, may find safe anchorage in North-west bay, just within the northern entrance of D'Entrecasteaux channel.

WINDS.—During great part of the summer season, from November to April, when the weather is fine and settled, sea and land breezes generally prevail, the land breeze coming off between 8 and 10 o'clock ; both these breezes are preceded by an interval of calms or light airs for two or three hours. From January to March the north-west winds come in very hard squalls.

CAPE RAOUL, the south point of Tasmania, is formed of high basaltic columns projecting 2 miles from the coast line. Its south-east point is bordered by a reef, and a cluster of dry and covered rocks extends about a mile from the south-west extreme of the cape. From cape Raoul the hilly western shore of Storm bay consists of a succession of small bays and points extending 7 miles in a north-westerly direction to the southern point of Quoin, or Wedge bay. Quoin, or Wedge isle, which lies half a mile off this point, is three-quarters of a mile long, North and South, and one-third of a mile broad, with some rocks close off its two ends.

QUOIN, or WEDGE BAY.—The entrance of Quoin bay extends from its southern point N. $\frac{3}{4}$ W. 2 miles to Norfolk head, with 7 to 11 fathoms water across it ; from its entrance the bay trends 2 miles eastward, where it terminates in a shallow bight about 1 mile wide, with two small islets lying between 1 and 2 cables' lengths from its northern shore ; close behind the low sandy eastern shore of this bight there are two lagoons. Besides being very shallow, Quoin bay is exposed to westerly winds.*

BURNETT HARBOUR, or PARSONS BAY is a considerable inlet on the north side of Quoin bay, having an entrance a quarter of a mile wide at N.N.E. 2 miles from Quoin isle, each point of the entrance being bordered by a narrow shoal. From its entrance Burnett harbour extends N.E. $1\frac{1}{4}$ miles, and from thence S.E. about the same distance. The former trend of the harbour is a quarter of a mile to 3 cables wide, with 12 to 9 and 6 fathoms water, and with long kelp about the entrance points and near the shore on either side. There is a small inlet on the north-west side of the harbour at two-thirds of a mile within the entrance.

The south-eastern, or inner trend of Burnett harbour, although wider, is more shallow than the outer one, with depths decreasing from 9 to $1\frac{1}{2}$ fathoms at one-third of a mile from the southern extreme of the harbour, over a bottom of stiff mud. The south-western shore of the inner part of the harbour is divided into two shallow bights by a point projecting to within one-third of a mile of the opposite shore ; there are also two shoal bights in the northern part of the harbour, fronted by a sand and mud-flat, having 1 to 3 feet water on it.

* See Plan of Burnett harbour, No. 1,083 ; scale, m = 2 inches.

Although Quoin bay and Burnett harbour are small, yet from their position opposite Derwent river, they may be often found convenient for small vessels when adverse winds prevent their entering that river. Fresh water may be procured, but with some difficulty.

From the west point of Roaring Beach bay, at $1\frac{1}{2}$ miles to the westward of Norfolk head, the western shore of Storm bay trends N.W. by W. 1 mile to North head, and from thence N. by W. $\frac{1}{4}$ W. $4\frac{1}{2}$ miles to North-west head, the eastern entrance point of North, or Frederick Henry bay. At N. by E. $\frac{3}{4}$ E. $1\frac{3}{4}$ miles from North head mount Communication rises to the height of 1,131 feet.

NORTH, or FREDERICK HENRY BAY is nearly $3\frac{1}{2}$ miles wide, W. $\frac{1}{2}$ N. and E. $\frac{1}{2}$ S., at its entrance, between cape Deslaco and North-west head, from whence it extends northward 9 miles to the entrance of Pitt Water, and is 6 miles wide. At N.N.W. $1\frac{3}{4}$ miles from cape Deslaco is the mouth of Pipe-clay lagoon, from whence the shore sweeps round north-westward $3\frac{1}{2}$ miles to the low sandy isthmus between Ralph and Frederick Henry bays; from hence the shore trends northward about 3 miles to the foot of Single hill, between which and the entrance of Pitt Water, at N.E. $\frac{1}{2}$ E. $4\frac{1}{2}$ miles from it, is a curved sandy beach.

NORTH-WEST POINT.—Between the eastern entrance head of North bay and North-west point, at N. by E. $\frac{1}{2}$ E. $4\frac{1}{2}$ miles from it, the south-east extreme of North bay recedes into a bight nearly 2 miles deep, its eastern shore being known as Sloping beach. North-west point, which forms the south-eastern side of the entrance of Norfolk bay, rises to a ridge, which is nearly separated from the land to the south-eastward by a lagoon.

SLOPING ISLE, which lies S.W. $1\frac{1}{4}$ miles from North-west point, is 1 mile long, North and South, with a reef of rocks extending from its south extreme, and Hog islet lying between its northern end and North-west point.

RENARD POINT, N. by W. $2\frac{1}{4}$ miles from North-west point, forms the north-western side of the entrance of Norfolk bay; between this and a small elevated peninsula at W.N.W. 2 miles from it, is a little bight, off which lies Doughboy islet, bearing W.S.W., distant $1\frac{1}{2}$ miles from point Renard. On the north side of the little peninsula is Carlton river, which is about 300 yards wide at the entrance, with a small islet close within it. Between Carlton river and the entrance of Pitt Water the land projects to a point, at half a mile to the southward of which is Spectacle islet, bearing N. $\frac{1}{2}$ E., distant 7 or 8 miles from cape Deslaco. A sunken patch lies S.S.E. 2 miles from Spectacle islet.

PITT WATER has a very narrow entrance, with 2 fathoms water in it, from whence this lagoon extends nearly 9 miles in a westerly direction ; within the entrance a narrow channel trends westward between two rocks, above which it passes close to a projecting head on the north side, and a point extending from the southern shore. There are 3 fathoms between the two rocks, and 6 and 5 fathoms in the channel to the eastward and westward of them.

NORFOLK BAY is a commodious harbour, where a large fleet may find sheltered anchorage in 9 to 4 fathoms, on good bottom, within the entrance, which is 2 miles wide, with 5 to 16 fathoms water ; the bay extends 9 miles, North and South, and is 3 to 5 miles wide, with soundings in 9 to 4 fathoms in the western, and greater portion of the bay.

From North-west point the western shore of Norfolk bay, after extending E. by S. $\frac{1}{4}$ S. $2\frac{1}{2}$ miles to Pig-face point, and from thence S.E. by S. 1 mile to Ironstone point, trends S. by W. $\frac{1}{4}$ W. $2\frac{1}{2}$ miles to a small bight, from whence the southern shore, consisting of a succession of deep bights and prominent points, curves 6 miles in an easterly direction to the south-west point of Little Norfolk bay. Those parts apparently most worthy of notice, being Salt-water river, Half-way bluff, Impression bay, and the Cascades, which lie respectively S. $\frac{1}{4}$ E. 3 miles, S.S.E. $\frac{1}{2}$ E. $3\frac{3}{4}$ miles, S.S.E. $\frac{1}{2}$ E. 5 miles, and S.E. $\frac{1}{4}$ E. 7 miles from Ironstone point.

LITTLE NORFOLK and EAGLE HAWK BAYS.—Between the south-western point of Little Norfolk bay and One Tree point, at $1\frac{1}{2}$ miles to the northward of it, is an opening divided into two channels by Woody isle, which lies N. by E. two-thirds of a mile from the former point. The southern of these two channels leads into Little Norfolk bay, and the other into Eagle Hawk bay ; the first trending S.S.E. 2 miles, and the other E.N.E. $3\frac{1}{2}$ miles from Woody isle. Eagle Hawk bay forms a narrow channel, reaching within 2 cables' lengths of the beach of Monge, or Pirates bay, on the east coast of Tasmania. Eagle Hawk neck, the isthmus thus formed, connects Tasman peninsula with Forestiers peninsula, to the northward of it.

The eastern shore of Norfolk bay, between One Tree point and the south-eastern point of Flinders bay, at N.W. by N. $1\frac{1}{3}$ miles from it, is divided into two small bights by a hilly projection, with some dry and covered rocks off it, and between it and One Tree point. Flinders bay is a double bight $1\frac{1}{4}$ miles wide from S.E. to N.W., and is separated from King George's sound to the northward of it, by a peninsula about 1 mile in extent.

KING GEORGE'S SOUND is half a mile wide at its entrance, between the small peninsula and King George's isle, to the northward of it, from
14561.

whence the sound trends about $2\frac{1}{4}$ miles in a north-easterly direction, with two small bays on its south-east side and an islet in its northern corner. King George's isle, which is about one-third of a mile in extent, lies half a mile south-westward of a point, between which and a peninsular projection at three-quarters of a mile to $1\frac{1}{2}$ miles north-westward of the island, is a double bay three-quarters of a mile wide and half a mile deep.

GARDEN ISLE, which lies nearly midway between the double bay and Pig-face point, is nearly 1 mile long, North and South, and half a mile broad. There are 4 to 7 fathoms between Garden isle and Ironstone point to the south-westward of it; but there is a $2\frac{1}{2}$ -fathoms shoal between the island and the peninsular projection to the north-eastward of it.

EAST BAY NECK.—Between this peninsular projection and a point at N.W. $\frac{1}{2}$ W. $1\frac{1}{2}$ miles from it, is a shallow bay, separated from Port Frederik Hendrik, to the north-eastward of it, by East Bay neck, the isthmus which connects Forestiers peninsula with the main-land of Tasmania. Green isle, which lies S.S.E. three-quarters of a mile from the north-west point of this bay, is 2 cables in extent.

The NORTHERN SHORE of Norfolk bay, from point Renard, trends irregularly in an E. by N. direction $4\frac{3}{4}$ miles to the north-west point of the shallow bay just described.

TASMAN PENINSULA, of which the south-western and northern coasts have been already described with the shores of Storm, North, and Norfolk bays, extends N.W. $\frac{1}{2}$ W. and S.E. $\frac{1}{2}$ E. 23 miles, and 13 miles across; it consists of wooded hills and fertile valleys, with numerous streams of pure fresh water.

CAPE PILLAR, the south-east extreme of Tasman peninsula, and which lies E. by N. $\frac{1}{2}$ N. 9 miles from cape Raoul, is the most remarkable headland on the coast, it being formed of perpendicular columns of basalt rising to a great height, and there forming a flat surface, the high land near the cape being mostly without wood.

TASMAN ISLE, which lies close to the southward of cape Pillar, is rocky and sterile. There is a narrow passage between the cape and the island, sometimes available for small vessels.

PORT ARTHUR.—The coast between capes Raoul and Pillar forms a bay, in which, midway between the two capes, is the entrance of Port Arthur, one of the most secure harbours in Tasmania.*

* See Plan of Port Arthur, No. 1,083; scale, $m = 2$ inches. But this differs considerably from a more recent plan of the "Approaches to the port of Hobart Town," published by the Government of Tasmania.

The **WEST HEAD** of the entrance of Port Arthur, which lies N.E. $4\frac{1}{4}$ miles from cape Raoul, is the south-east point of a peninsula projecting nearly two miles from the line of coast, with a small cove, named Half-moon bay, between the head and another point at three-quarters of a mile to the northward of it. There are 40 fathoms water at 2 cables' lengths off West head ; but Black rock, at about 1 mile to the south-westward of the head, appears to be connected with it by a reef of rocks.

The entrance of Port Arthur, between the northern point of Half-moon bay and the bold East head to the north-eastward of it, is nearly three-quarters of a mile wide, with 20 fathoms water within it. From the East head the steep eastern shore slightly curves in a N. by W. $\frac{1}{2}$ W. direction $3\frac{1}{2}$ miles to the head of North-east bay, which is two-thirds of a mile wide, East and West.

SAFETY COVE.—The western shore of Port Arthur forms three bays capable of affording sheltered anchorage for the largest ships. From the northern point of Half-moon bay the western shore trends N.W. $\frac{1}{2}$ W.. three-quarters of a mile to the south point of the entrance of Safety cove, which extends two-thirds of a mile, North and South, and half a mile, East and West, with 10 to 3 fathoms water.

POINT PUER.—Safety cove is separated from Opossum bay to the northward of it, by point Puer, which from the cove extends about 1 mile to the north-eastward and northward ; from the breadth of a quarter of a mile near Safety cove, the point gradually narrows to its north extreme, close off which is Dead islet.

From the entrance of Port Arthur there are depths of 17 to 26 fathoms in mid-channel, and 8 to 12 fathoms close along the shores for a distance of 2 miles up to the north extreme of point Puer, the bottom being mostly sand.

OPOSSUM and STEWART BAYS.—Opossum bay is three-quarters of a mile wide, N.W. and S.E., at its entrance between point Puer and the southern point of Stewart bay, to the north-westward of it. From its entrance Opossum bay extends about a mile to the southward, the southern shore being fronted by a sand and mud-flat, but in the outer, and greater portion of the bay there are 13 to 5 fathoms, with deep water on the north-west side of the bay.

Stewart bay is one-third of a mile wide, N. by E. $\frac{1}{2}$ E. and S. by W. $\frac{1}{2}$ W., and a quarter of a mile deep. This and the north-western portion of Opossum bay form the water frontage of the settlement of Port Arthur.

LONG BAY.—Between the northern point of Stewart bay and the western extreme of North-east bay, at one-third of a mile to the north-eastward of it, is the entrance of Long bay, which trends to the north-

westward and northward $1\frac{1}{2}$ miles, with an average width of a quarter of a mile, and 11 to 4 fathoms water. At 1 mile within the entrance, a narrow point projects from the western shore, on the south side of which is a small cove. A tramway extends from Long bay N. by W. 3 miles to Little Norfolk bay.

This harbour is situated within an amphitheatre of lofty wooded hills, the land about the settlement being very fertile, well watered, and of a most pleasing aspect. There had been for many years, a penal settlement at Port Arthur, where there was a very extensive convict establishment, and there was a small ship-building yard on the eastern shore of the port, where H.M.S. *Bramble* was hove down and partially repaired. But this naval establishment has been since discontinued, and the stores have been removed to Hobart Town, with which place the chief communication is through Norfolk bay.

Supplies.—There is excellent timber about Port Arthur, amongst which may be enumerated great quantities of gum, stringy bark, light wood, and sassafras. Water is abundant, nearly all the bays having small streams of fresh water flowing into them.

TIDES.—It is high water in Port Arthur, full and change, at 7h. 52m.; rise 4 feet.

EAST COAST OF TASMANIA.

The EAST COAST of TASMANIA from cape Pillar curves 5 miles in a N. by W. $\frac{1}{4}$ W. direction to cape Hauy, which has a cluster of rocks close off it, and forms the southern point of Dolomieu, or Fortescue bay.

HIPPOLITE ROCKS are situated immediately in front of Dolomieu bay, between E.N.E. and N.E. by N. 1 to $2\frac{1}{2}$ miles from cape Hauy; they consist of two rocks above water and covered patches, the eastern and most elevated rock being 70 feet high. There are 50 fathoms water between the Hippolite rocks and those which lie close off cape Hauy.

DOLOMIEU BAY is $1\frac{1}{2}$ miles wide, N.W. and S.E., and $1\frac{1}{2}$ miles deep, with a white sandy beach, but it is sheltered only with land winds, the Hippolite rocks off the bay, not being sufficient to protect it from seaward.

MONGE, or PIRATE BAY.—From Dolomieu bay the coast trends nearly N.N.W. $\frac{1}{2}$ W. 6 miles to the south-eastern point of Monge bay, between 1 and 3 cables' lengths to the north-westward of which is the isle of Fossils, connected with the shore by a reef of dry and sunken rocks. From its south-eastern point Monge bay extends N.N.W. $\frac{1}{2}$ W. $1\frac{1}{2}$ miles to its north-western point, close off which lie the two Clyde islets. This bay is three-quarters of a mile deep, with a small sandy beach in its

southern bight, and a more extensive one along its western shore; the latter forms the narrow isthmus which connects Tasman peninsula with Forestiers peninsula, to the northward of it. On the north-western shore of Monge bay is an extensive level of basaltic rock, much resembling a pavement of large flat stones, laid with remarkable regularity between straight parallel lines.

From Monge bay the coast extends $4\frac{1}{4}$ miles in a N. by E. $\frac{1}{2}$ E. direction to cape Surville; a small islet lies close to a point at three-quarters of a mile north-eastward of the north-eastern point of Monge bay, and at half a mile to the south-eastward of cape Surville, the Sisters islets lie within half a mile of a projection of the coast. Immediately behind a bay, midway between Eagle Hawk neck and cape Surville, mount MacGregor rises to the height of 1,943 feet.

Between cape Surville and a projection at N. by W. $1\frac{1}{4}$ miles from it, is a bay half a mile deep, having two small islets or rocks, one close within the cape, and the other near the shore midway between the two points of the bay. From the northern point of this bay the coast extends N. by W. $1\frac{1}{4}$ miles to Yellow bluff, and from thence N.W. by N. the same distance to Humper bluff. The coast is high and bordered with rocks above and under water, and affords neither anchorage nor shelter, as the sea breaks upon every part of it with violence.

WILMOT COVE is the western end of an inlet trending W.S.W. $1\frac{1}{4}$ miles from its entrance, between Humper bluff and cape Frederik Hendrik, at N. by W. two-thirds of a mile from it. The southern shore of this inlet is fronted by several rocks and small islets, the largest and most distant from the shore being the Kelly islets, which lie midway between Humper bluff and Wilmot cove, some rocks also extend south-eastward from the extremity of cape Frederik Hendrik.

CAPE FREDERIK HENDRIK is a narrow point stretching $1\frac{1}{2}$ miles in a N.E. by E. $\frac{1}{2}$ E. direction from the line of coast, and forms the south-eastern point of Marion bay.

MARION BAY is an exposed indentation of the coast, extending from cape Frederik Hendrik N.N.W. $8\frac{1}{2}$ miles to cape Bernier, and is 4 miles deep, but the only part at all available for vessels is in the southern portion of the bay.

NORTH BAY, which forms the southern portion of Marion bay, extends from cape Frederik Hendrik N.W. by W. 3 miles to cape Paul Lamanon, and is $1\frac{1}{4}$ miles deep, with a small inlet at W.S.W. 2 miles from the extremity of the former cape. Green islet, which lies in front of the bay, at N. by W. $1\frac{1}{4}$ miles from cape Frederik Hendrik, is too small to afford any protection from seaward.

CAPE PAUL LAMANON is a small projecting point, with High rocks and others above and under water, close to it. From this cape the coast trends westward 1 mile to the north-eastern entrance point of Port Frederik Hendrik, and is bordered by a reef of rocks.

PORT FREDERIK HENDRIK is an extensive, but shoal inlet on the south-western side of Marion bay, the south-west side of its confined entrance being formed by a narrow point which projects S.E. by S. 2 miles from the western, to within one-third of a mile of the opposite shore. This port is nearly of a triangular form, extending from its entrance S.W. by S. $4\frac{1}{2}$ miles to within about a quarter of a mile of the north-eastern shore of Norfolk bay, and is 3 miles wide from S.E. to N.W. The shores are high, and form a projecting double point on the east side, and two long narrow projections on the west side.

M. Freycinet, the French navigator, says:—"The breakers which are at the entrance of Port Frederik Hendrik, appear to render the channel difficult; it has, however, not less than 3 fathoms water, and by ranging tolerably close to the reef off the outer point, and then closing the eastern shore, deeper and smoother water will be found. This port can be useful to vessels of small tonnage only, the soundings being irregular and everywhere shallow. In the south port, where they appear to be deepest, we had only 3 fathoms, and the port is otherwise obstructed by extensive banks, which dry at low water. A single rivulet of fresh water was found in the south-east part of the port; but a boat cannot approach within a mile of it. The many dry torrent beds, however, show that there is no want of water in the rainy season."

"Wood may be had here, and plenty of fish may be taken on the large bank at the entrance. The country is of the same description as that in D'Entrecasteaux channel."

"**TIDES.**—It was not possible to make any correct observations of the tides, but they rise about 4 feet, and produce a current at the entrance, of about 2 knots."

From the entrance of Port Frederik Hendrik a flat sandy beach curves N. $\frac{3}{4}$ W. 5 miles to point Du Ressac: landing is at all times dangerous on this beach, and is impossible with winds from the sea, as an enormous surf breaks more than 2 cables' lengths off it. A mountain torrent pours through this beach in the rainy season.

Between point Du Ressac and cape Bernier the coast, which is of moderate height, forms two sandy bights that may be approached with off shore winds, when that nearest the cape will be found the most convenient.

CAPE BERNIER is high and very remarkable on account of its conical shape; there are 6 and 7 fathoms close to the southward and eastward of it.

MARIA ISLAND is separated from the east coast of Tasmania by a navigable channel $2\frac{1}{2}$ to $4\frac{1}{2}$ miles wide ; cape Peron, its south point, lying East $3\frac{1}{2}$ miles from cape Bernier. From cape Peron the Pyramid and other rocks extend nearly 1 mile to the southward. The island is 11 miles long, North and South, and at N. by E. $\frac{1}{2}$ E. 5 miles from cape Peron, is nearly divided by Riedlé bay on the east, and Oyster bay on the west side, there being only a low sandy isthmus between them. The southern part of the island is $3\frac{1}{2}$ miles, and the northern $6\frac{1}{2}$ miles broad.

From cape Peron the southern coast of Maria island trends N.E. by E. 3 miles to cape Mourouard, on the south-west side of which is a small inlet. From this cape the coast trends irregularly, 1 mile north-eastward to cape Bald, and from thence N.N.W. $\frac{1}{2}$ W. $2\frac{1}{2}$ miles to the south-western point of Riedlé bay. There are 10 fathoms water close to cape Bald ; but some rocks lie near the shore at $1\frac{1}{2}$ miles to the northward of the cape.

The south and east coasts of Maria island are all of granite, and rise abruptly, like a wall, to the height of 200 feet, but gradually descend from cape Mourouard toward Riedlé bay. There are some caves in which the water breaks with a great noise.

RIEDLÉ BAY extends nearly 2 miles across from S.W. to N.E., and is 1 mile deep, with some rocks projecting from its western and northern shores. There are 15 to 9 fathoms, fine sand, in the south-western part of the bay, but in the north-eastern part there are only 5 or 6 fathoms. Riedlé bay affords but bad anchorage for vessels remaining any length of time, it being entirely exposed to the wind and sea from South to N.E. Landing may be effected at the south-western part of the bay, with the wind off the land, but farther to the northward, the approach to the shore is prevented by a dangerous bar.

From cape Mistaken, which lies E. by N. $1\frac{1}{4}$ miles from the north-eastern point of Riedlé bay, the eastern coast of Maria island trends N.N.E. $\frac{1}{2}$ E. $1\frac{1}{2}$ miles to Ragged head, with a small islet or rock close to the east side of the cape. The coast from Ragged head extends N.W. $\frac{1}{2}$ N. 5 miles to cape Boullanger, with a small inlet midway, and some rocks near the shore at 2 miles to the north-westward of the head. The land rises from this high steep coast to a lofty ridge, mount Maria, W.N.W. 3 miles from Ragged head, being 2,329 feet, and Bishop and Clerk mount, at $1\frac{1}{4}$ miles south-eastward of cape Boullanger, being 3,000 feet high. There are 19 fathoms at about 1 mile from the shore between capes Mistaken and Boullanger.

From cape Boullanger the northern end of Maria island forms a bay extending W. $\frac{1}{2}$ N. 2 miles to the north point of the island, at half a mile

off which is North islet, with the Black, and other rocks between it and the shore to the south-eastward of the islet.

The western coast of Maria island from cape Peron, trends N.N.W. $1\frac{1}{2}$ miles, and from thence N. by E. $\frac{1}{2}$ E. 3 miles to the south-east point of Oyster bay. There are $3\frac{1}{2}$ to 4 fathoms along this coast, but the point is enclosed by a shoal.

OYSTER BAY is $1\frac{1}{4}$ miles wide from S.E. to N.W., at its entrance, within which the bay expands to $2\frac{1}{4}$ miles, and is $1\frac{1}{4}$ miles deep, but its shores are bordered by a shallow flat : the greatest depth of water in the bay is not more than $3\frac{1}{2}$ fathoms, and it generally does not exceed 2 or 3 fathoms, with a white sandy bottom.

The northern side of the entrance of Oyster bay is formed by a low narrow point, projecting south-westward nearly $1\frac{1}{2}$ miles from the coast-line, from the extremity of which the western coast of Maria island extends N. by E. $\frac{1}{2}$ E. 6 miles to its north point, and forms a succession of small bights and points, bordered by a shoal, on which are some sunken rocks.

SETTLEMENT.—The north-western part of Maria island from Oyster bay to cape Bougainville, is low and wooded ; and immediately on the south-west side of the north point of Maria island there is a small cove, close to which is the Settlement.

Productions.—The soil of Maria island is excellent, and very deep in the valleys. Oysters, lobsters, and muscles are abundant, and the former of an extraordinary size ; but other kinds of fish are scarce, particularly in the beginning of winter.

WINDS.—Whilst at anchor abreast of Oyster bay, M. Freycinet found the winds to blow from all points of the compass ; those from N.N.E. to S.S.E. being the most constant, and from S.S.W. the strongest ; and he had often rain and fog, without being able to observe if they were dependent or not, on the direction of the prevalent winds.

The eastern coast of Tasmania from cape Bernier, extends northward $3\frac{1}{2}$ miles to Galets point, and is steep, with 6 or 7 fathoms water close to it. Cockles bay is merely a slight indentation of the coast, terminating to the southward in a small inlet, on the west side of Pebbly point, which lies 2 miles to the northward of cape Bernier.

From Galets point the coast trends north-westward nearly $2\frac{1}{2}$ miles to the head of a small inlet formed on its north-east side, by a low narrow point stretching out about 1 mile south-eastward from the coast-line. This point is fronted by a sandy beach, and a small stream flows into the inlet.

LACHLAN ISLET, which lies E.N.E. 1 mile from this point, is of an oval form, its greatest diameter being about 2 cables in extent. It is encircled with large rocks and shingle, and has neither tree nor shrub. The

soil, however, which covers the face of the granite rock of which it is formed, appears to be of a good quality; and a species of fine long cow-grass, an excellent pasture for cattle, grows there in abundance.

Between the low narrow point abreast of this islet, and a steep cape at N. by W. $2\frac{1}{2}$ miles from the point, the coast is slightly embayed, with $5\frac{1}{2}$ fathoms at about a mile from the shore. From this cape a high rocky coast extends 3 miles in a N.W. $\frac{1}{2}$ W. direction to the southern point of the entrance of Prosser bay. A range of mountains extends from S. by W. to N. by E. behind the coast from Port Frederik Hendrik to Prosser bay, its principal summits being Gordon Sugar-loaf, 1,350 feet high, and Prosser Sugar-loaf, 2,195 feet high, the former bearing S.W. by W. $\frac{1}{2}$ W., distant $8\frac{1}{2}$ miles, and the latter W.N.W. 6 miles from cape Bernier. Thumbs, the northernmost summit of this range, at about $3\frac{1}{2}$ miles to the south-westward of Prosser bay, is 1,805 feet high.

Between the steep rocky cape just noticed, and a projecting point at $2\frac{1}{2}$ miles to the northward of it, is a deep bay extending 2 miles north-westward to a broad point, which separates Prosser bay from Spring bay, to the north-eastward of it.

Prosser bay is about $1\frac{1}{2}$ miles in extent, but it is filled by a mud-bank, on which there are only 9 to 6 feet water. A vessel may anchor off its entrance, in 9 to 4 fathoms, on a muddy bottom, but not sheltered from the southerly winds, which are so violent in this locality.

Many salt streams that swell with the rains, have an outlet in this bay, and at the time of exploring it, in the month of February, there was no fresh water. The land in the neighbourhood is marshy and without trees, but in the interior of the country, the woods appear to multiply and vegetation to resume its force.

SPRING BAY is about half a mile wide at its entrance, with 4 fathoms water in it, from whence the bay trends above 2 miles in a N.N.W. direction, with an average width of half a mile.

From the projecting point at $1\frac{1}{2}$ miles south-eastward of the entrance of Spring bay, the coast trends N. by E. $\frac{1}{2}$ E. 3 miles, and then turns S.E. 1 mile to the south extreme of cape Bougainville. This coast is steep and almost inaccessible, with not less than 13 fathoms close to the shore.

CAPE BOUGAINVILLE is a double point about a mile broad, projecting 1 mile south-eastward from the line of coast: some sunken rocks extend a short distance from the cape, close outside which there are 17 fathoms water.

The CHANNEL between the east coast of Tasmania and Maria island is $3\frac{1}{2}$ miles wide at its southern entrance, between capes Bernier and Peron, and there is the same width at its northern entrance, between cape

Bougainville and the north point of Maria island, but midway, it is contracted to two narrow channels by Lachlan islet and the rocks about it. There are 8 and 9 fathoms water in mid-channel off Oyster bay, 7 fathoms at 2 miles northward of the islet, and 19 fathoms in the northern entrance of the channel.

From cape Bougainville the coast curves in a N. by W. direction $5\frac{1}{2}$ miles to the south-east point of Grindstone bay. Between 1 and $2\frac{1}{2}$ miles northward of the cape there are two small inlets, close off which are some sunken rocks ; but there are 17 to 24 fathoms at 1 to 2 miles from the shore between the cape and the bay.

CAPE BAILLY.—From Grindstone bay, which is a small inlet trending to the westward, the coast trends N.W. 2 miles, and from thence N.N.E. 4 miles to cape Bailly, on the southern side of which are some rocks above water, with 10 fathoms close outside them, and there are 16 to 14 fathoms between Grindstone bay and the cape. The land from cape Bougainville to cape Bailly is less elevated, but still steep and wooded like that to the southward.

ILE DES PHOQUES, E. by N. 7 miles from Grindstone bay, is a sterile rock about 2 or 3 cables in extent ; there are 12 fathoms water close to the southward of it, and 26 to 24 fathoms between it and the shore.

SCHOUTEN ISLAND, which forms the east side of the entrance of Fleurieu or Oyster bay, is $4\frac{1}{2}$ miles long, East and West, and 1 to 2 miles broad, with cape Faure, its south-west extreme, bearing E.N.E., distant $9\frac{1}{2}$ miles from cape Bailly. Cape Sonnerat, the south extreme of the island, which lies E. by S. 3 miles from cape Faure, has groups of islets and rocks extending 2 miles to the southward from it, the southernmost being the Taillefer islets ; an islet also lies 1 mile off the north-west extreme of the island.

Water.—There is a small stream of excellent water on the southern part of Schouten island, where a boat may easily land ; and the inlet at the eastern end of the island may possibly afford a landing-place.

GEOGRAPHE STRAIT, which separates Schouten island from the south point of Freycinet peninsula, to the northward of it, is about half a mile across at its narrowest part, with apparently no other detached danger than a small rock above water, close off the south point of the peninsula.

FREYCINET PENINSULA extends 6 miles, North and South, and $3\frac{1}{2}$ miles across its broadest part, from whence it gradually narrows to its south point. The east side of the peninsula from its south point, trends nearly N. by E. $\frac{1}{4}$ E. $5\frac{1}{2}$ miles to its north-east point, from whence the northern end turns West and S.W. $2\frac{1}{2}$ miles to the isthmus which connects this with another peninsula to the northward of it. The eastern side is

partly bordered with rocks, and the south-west and north-west sides are slightly indented.

THE ISTHMUS which connects Freycinet peninsula with a smaller one to the northward of it, is $1\frac{1}{2}$ miles long, N.W. and S.E., and half a mile broad, the greater portion of it being occupied by a pond of fresh water supplied by the rains ; it is separated from the bay on its western side, by a barrier of sand about 50 yards broad ; the other part of the isthmus is tolerably well wooded.

The peninsula to the northward of this isthmus extends 4 miles East and West, the isthmus which connects it with the land farther North, being one mile broad.

THOUIN and SLEEPY BAYS.—CAPE TOURVILLE.—Thouin bay, the bight on the east side of the southern isthmus, extends about 1 mile North and South, and is half a mile deep ; but it is exposed to the eastward. From the northern point of this bay the east side of the northern peninsula trends nearly N. by W. $2\frac{1}{2}$ miles to the head of Sleepy bay, a small bight on the south side of cape Tourville. This cape projects about half a mile to the south-eastward, with a cluster of small islets or rocks extending from it about 1 mile to the north-eastward ; these, together with the cape, probably protect Sleepy bay from the northward, although it must be fully exposed to the southward and eastward.

ASPECT.—Freycinet peninsula and Schouten island are high, steep, and sterile towards the sea, but low and wooded on the western side ; cape Tourville being also high, these alternate mountains and isthmuses give, at sea, this part of the coast the appearance of a chain of islands.

FLEURIEU or OYSTER BAY is formed on the east side by Schouten island and the peninsulas to the northward of it ; and on the west side by the coast extending northward from cape Bailly. This bay is $9\frac{1}{2}$ miles wide at its entrance, from whence it extends North 14 miles to its low northern shore.

THE WEST SHORE of Fleurieu bay from cape Bailly, extends N.N.W. 2 miles, and then turns westward 1 mile to the entrance of Little Swan port. A rock above water, with 11 fathoms close to the northward of it, lies near the shore at 1 mile to the northward of the cape.

LITTLE SWAN PORT does not appear to be more than 1 cable wide at its entrance, but the port extends from thence 3 miles in a S.W. direction, with the width of a mile ; it is, however, only fit for boats. There are two small islets in the western part of Little Swan port, between which and its northern shore is the mouth of Little Swan port river, an inconsiderable stream winding from the westward. A mountain of the same name, at S.W. by W. $\frac{1}{4}$ W. 9 miles from cape Bailly, is 1,757 feet high.

From Little Swan port the western shore of Fleurieu bay extends N. by E. $3\frac{1}{2}$ miles to Buxton point, and is intersected by two small streams,

one at $1\frac{1}{4}$ miles and the other at $2\frac{3}{4}$ miles northward of the entrance of the port. The coast from Buxton point, after turning about 1 mile to the north-westward, trends N.N.E. $\frac{1}{4}$ E. $5\frac{1}{2}$ miles to Webber point, between which and Waterloo point, at N. by W. $2\frac{1}{2}$ miles from it, the coast forms a slight indentation, with a small stream flowing into it at 1 mile northward of Webber point, and an inlet close to the southward of Waterloo point.

At about 1 mile north-westward of Waterloo point is the mouth of a small stream flowing from the south-westward, from whence the northern shore of Fleurieu bay curves E. by N. $\frac{3}{4}$ N. 7 miles to the entrance of Great Swan port. For about 5 miles westward from this opening the shore forms the south side of a low tongue of land, which separates Fleurieu bay from Great Swan port.

EASTERN SHORES.—REFUGE ISLET.—The eastern shores of Fleurieu bay have already been described as far North as the isthmus between Freycinet peninsula and that to the northward of it, on the west side of which the bay affords good anchorage, sheltered by Refuge islet, which, with some rocks close to the southward of it, lies near the shore at 1 mile from the north-western part of the isthmus.

Wood and Water.—A vessel anchored in this bay may procure wood with facility, and plenty of water from the pond on the isthmus.

HEPBURN POINT.—The bay on the west side of the northern isthmus, abreast of Sleepy bay, is $1\frac{1}{4}$ miles wide at its entrance between the west point of the northern peninsula and Hepburn point, to the northward of it, and is about 2 miles deep. Although there are several rocks in this bay, it is said to afford good anchorage. From Hepburn point the eastern shore of Fleurieu bay trends N.W. by N. $1\frac{1}{2}$ miles to the entrance of Great Swan port.

SOUNDINGS.—The French navigators did not sound the middle of Fleurieu bay ; but there are 12 to 6 fathoms from 1 mile off Buxton point to close off Webber point, from whence, to within half a mile of the northern shore, there are 7 to $5\frac{1}{2}$ fathoms, with $4\frac{1}{2}$ fathoms between the latter depth and the entrance of Great Swan port. From half a mile off the west point of the northern peninsula to the same distance off Hepburn point there are 7 to $4\frac{1}{2}$ fathoms. Judging from these soundings, M. Freycinet was of opinion that there were many good anchorages in Fleurieu bay, although it is entirely open to the southward.

GREAT SWAN PORT.—From its entrance, which does not appear to be more than about 1 cable wide, Great Swan port trends westward 5 miles along the north side of the tongue of land before noticed, to the mouth of Swan river, which flows into the port from the northward and westward. The port, from its entrance increases westward to 1 mile in width.

MOULTING LAGOON.—At $1\frac{1}{2}$ miles north-eastward of the mouth of Swan river is a narrow opening communicating with Moulting lagoon, which extends from thence 5 miles in a N.N.E. direction, forming, by a projection of the north-western shore, two basins, the south-western being $2\frac{1}{2}$ miles, and the north-eastern $1\frac{1}{2}$ miles in extent. There are several islets, or rocks in this lagoon, and a small stream flows into the north-eastern basin from the northward.

BLUESTONE BAY.—The east coast of Tasmania from cape Tourville, extends 2 miles in a N. $\frac{1}{4}$ E. direction to the south-east point of Bluestone bay, and after receding from thence half a mile to the westward, trends N.N.W. $\frac{1}{2}$ W. 3 miles to a double headland, having on its west side a small inlet, and at N.W. by N. $1\frac{1}{4}$ miles from this, is a larger opening. Between the latter and Moulting lagoon, at 2 miles to the westward of it, the land rises to mount Peter.

CAPE LODI.—From the north-western of these two inlets the coast extends northward 7 miles to cape Lodi, at 3 miles to the southward of which a point projects half a mile to the south-eastward from the line of coast. There are 14 fathoms water within a mile of the south-east point of Bluestone bay and 9 fathoms close off cape Lodi, with 8 to 5 fathoms near the shore between these points.

PEGGY POINT.—From cape Lodi the coast curves N. by W. $2\frac{3}{4}$ miles to Peggy point, close off which is a small islet. The coast from Peggy point forms a bay 2 miles deep, extending N. by W. $\frac{1}{4}$ W. $7\frac{1}{2}$ miles to the south extreme of Long point. The shores of this bay are intersected by several inlets and small streams, the largest of the former being an opening, with a small islet in it, at N.W. $3\frac{1}{2}$ miles from Peggy point. At midway between the point and the opening, Diamond islet lies close to the shore.

LONG POINT is of a peninsular form, with its eastern face extending above a mile North and South, and forming a small bight on either side of the isthmus which connects it with the main-land to the westward of it. These little bays have jetties, with coal shoots for the convenience of coasting vessels.

COAL.—There are exports of coal, fire-clay, &c. from Long point, a seam of very good coal having recently been opened, and being now worked by a company, at about half a mile from Long point.

ST. PATRICK HEAD.—At N.N.W. one mile from Long point is an inlet trending within its narrow entrance, northward and southward parallel with the shore. From this inlet the coast extends $9\frac{1}{4}$ miles in a North direction to St. Patrick head, which, together with the shore for about 2 miles to the southward of it, is bordered by a reef. There are 10 fathoms water close to the northward of the reef, which projects but a short distance from the head in that direction.

SOUNDINGS.—From 10 miles eastward of cape Tourville to 7 miles north-eastward of Long point there are 66 to 40 fathoms, with similar depths at about 5 miles from the shore; but immediately outside those soundings there is no bottom at 89 fathoms.

From St. Patrick head the coast trends W. by N. $\frac{1}{2}$ N. $1\frac{1}{2}$ miles, and from thence N. by W. $\frac{3}{4}$ W. 3 miles to the entrance of a creek trending irregularly, nearly 2 miles in a N.N.W. direction. At about 2 miles farther to the northward is the mouth of a small stream flowing from the northward and westward. From the mouth of this stream the coast extends N. $\frac{1}{4}$ E. 5 miles to the entrance of a creek having a small arm trending to the westward and a larger one to the southward. At S.S.W. 2 miles from this creek lies Paddy islet, at about half a mile from the shore. The coast, consisting of a slightly curved sandy beach, next trends nearly N. $\frac{1}{2}$ E. 6 miles to St. Helens point.

MAUROUARD ISLE, which lies South 5 miles from St. Helens point, and a little more than a mile from the shore, is nearly three-quarters of a mile long, East and West, with a rocky reef extending from it to the southward. Some fresh water has been found on the island, and in case of absolute necessity, a vessel might anchor in 18 fathoms, between it and the shore. Between Maurouard isle and St. Helens point there are 16, 11, and 5 fathoms within half a mile of the shore.

ASPECT.—From cape Tourville to cape Lodi the coast is rocky and barren, but towards St. Patrick head it appears to be well wooded, and, rising higher near St. Helens point, presents several remarkable points of a pyramidal shape in the interior, the three most worthy of notice within 10 miles of the coast, being Lyne Sugar-loaf, 1,777 feet high, at W. $\frac{1}{2}$ S. 8 miles from cape Lodi; mount St. John, 2,550 feet high, at S.W. by W. $\frac{3}{4}$ W. 10 miles from Long point; and mount Nicholas, 2,812 feet high, at about 10 miles to the westward of St. Patrick head. There are more lofty mountains in the interior, St. Paul Dome, at W. $\frac{1}{2}$ S. 11 miles from mount St. John, being 3,368 feet, and Ben Lomond, at about N.W. $\frac{1}{2}$ W. 11 miles from the Dome, being 5,010 feet high.

ST. HELENS POINT is the northern end of a long, and comparatively narrow tongue of land, with a continuous ridge of hills on it, extending in a N. by E. and N.N.E. direction to Bare Top hill, which, at two-thirds of a mile within the north-east extreme of the cape, rises to the height of 250 feet, in lat. $41^{\circ} 17' S.$, long. $148^{\circ} 21' 30'' E.$ The cape from Bare Top hill to its north-east extreme is about three-quarters of a mile broad, and thickly fringed with rocks, none of which appear to extend beyond a cable's length from the shore, except from the south-east extreme of the cape, from whence, according to the Admiralty Chart, No. 1,079, a reef of rocks extends nearly 3 miles south-eastward from the shore; there are

60 fathoms at a mile off the end of this reef, and 66 fathoms at 4 miles farther to the eastward.

GEORGE BAY is an extensive harbour on the west side of the long tongue of land just noticed, with a wide deep approach from the sea, between St. Helens point and Grant point, to the north-westward of it.*

GRANT POINT and ELEPHANT ROCK.—Grant point, the outer north-western point of the entrance of George bay, is a rocky projection bearing N.N.W. $\frac{3}{4}$ W., distant 2 miles from Bare Top hill. The land rises from Grant point to the height of 1,203 feet at mount Pearson, which bears W. $\frac{1}{2}$ N., distant $4\frac{1}{2}$ miles from the point. Elephant rock, which lies N.E. by N. a quarter of a mile from Grant point, is the south-easternmost of a cluster of small islets and rocks, altogether not exceeding 2 cables in extent.

ENTRANCE.—From Grant point the shore trends S.S.E. nearly half a mile to the inner north-western point of the entrance, which is $1\frac{1}{4}$ miles wide, N.W. by W. and S.E. by E. between this point and the north-west extreme of St. Helens point. There are 14 fathoms in mid-channel, with decreasing soundings to 7 and 9 fathoms at a cable's length off the south-east side of the entrance, and 7 to 5 fathoms within 2 cables' lengths of the north-west side. From this line of soundings the depths decrease to 4 and 3 fathoms when Bare Top hill bears S.E. The shoalest water outside the bar, is within a quarter of a mile of the shore to the north-westward of Bare Top hill; but the depths quickly decrease to 9 and 8 feet upon the bar, which extends across the channel leading into George bay.

From the north extreme of St. Helens point a very broken rocky shore extends nearly S.W. one mile, from whence a low smooth shore trends West one-third of a mile to Blanche point, which lies W. $\frac{1}{2}$ S. nearly one mile from Bare Top hill.

SOUTH SHOAL, which has irregular depths of 1 to 5 feet water on it, extends nearly half way across from the south-eastern, to the opposite shore. From half a mile north-eastward of Blanche point the north-western edge of South shoal curves to $1\frac{3}{4}$ cables' lengths north-westward of the point. A bight, one cable wide, with 10 to 6 feet water in it, runs in south-westward between the north-eastern end of the shoal and the shore, and a spit, with two knolls to the northward of it, projects about 150 yards from Blanche point.

MIDDLE SHOAL is a bank 200 to 150 yards broad, with 2 to 5 feet water on it, lying N.E. and S.W., nearly parallel with the north-western edge of South shoal, of which it may be considered to form the outer part,

* See Plan of George bay, No. 1,081; scale, π = 3 inches.

as it is only in the south-western end of the space between the two shoals that the water is one foot deeper than it is on Middle shoal itself. The north-eastern end of this shoal lies N.E. by N. 6 cables' lengths, and the south-western, N.N.W. 2 cables' lengths from Blanche point.

GRANITE ROCK, DORA, and CLERK POINTS.—From the inner north-western point of the entrance the irregular rocky western shore extends S. $\frac{3}{4}$ W. $1\frac{1}{10}$ miles to Granite Rock point, from whence a more uniform shore trends S.W. $\frac{3}{4}$ S. nearly a quarter of a mile to Dora point, and then a quarter of a mile farther in the same direction to Clerk point, which lies West one-third of a mile from Blanche point.

NORTH SHOAL.—The shore for about one-third of a mile northward from Granite Rock point is fronted by the North shoal, which has 2 to 4 feet water on it, and extends a quarter of a mile from the shore, terminating in a narrow irregular spit, with 4 and 5 feet water on it, at N.E. four cables' lengths from Granite Rock point.

OUTER BAR.—The channel between North and Middle shoals, which is the principal passage into George bay, is about 120 to 270 yards wide, with only 8 and 9 feet water on the bar across its entrance. This bar appears to be permanent, as its state, when surveyed in 1862, by Lieutenant Brooker, agreed with Major Cotton's report and with earlier records. From the bar the depth of water increases to $4\frac{3}{4}$ fathoms in the channel at 1 cable's length to the southward of Granite Rock point.

The low eastern shore between Blanche point and Atkins point, at S. by W. $\frac{1}{2}$ W. $1\frac{1}{2}$ miles from it, forms two bights, separated by Pelican point, a low sandy spit projecting 2 cables' length to the south-westward and southward. The northern bight is filled by shoals and sand-banks, with 1 to 8 feet water between them; and the southern bight is occupied by a sand and mud-flat. The outer edge of the former extends about 100 yards beyond the line between Blanche and Pelican points; and the outer edge of the sand and mud-flat recedes about 150 yards from the line between Pelican and Atkins points.

HORSE SHOE BANK, which has 1 to 5 feet water on it, and which appears to be the great obstacle to the navigation of George bay, is a continuation of the South shoal, extending to one-third of a mile S.W. $\frac{1}{2}$ S. of Blanche point. From the sand-spit which projects from the point, the eastern edge of Horse Shoe bank trends South and S.W. 4 cables' lengths to its south point, leaving an inlet between the bank and the shoal which fronts the eastern shore, with $1\frac{1}{2}$ to $2\frac{1}{4}$ fathoms in it, reaching to within 100 yards of Blanche point. From its south point the western edge of Horse Shoe bank sweeps round north-westward and northward 4 cables' lengths to its north-west spit, on which there are 6 feet water.

INNER BAR.—The channel from Dora point is uncertain ; sometimes it takes a former direction, known as Glover's channel, at others by the western shore, and when surveyed in 1862, it passed between the north-west spit of Horse Shoe bank and some small patches close off Dora point, the channel being there about 70 yards wide, with a bar, on which there were 7 feet water. From thence the channel gradually increased to 150 yards in width off Clerk point, with depths of $1\frac{1}{2}$ to $2\frac{1}{2}$ fathoms ; but at 100 yards northward of this point a spit, with 4 feet water on it, projects from the western shore to within 60 yards of Horse Shoe bank.

On the east side of the north-west spit of Horse Shoe bank there was in 1862, a blind channel 150 yards wide, with $4\frac{1}{2}$ to $1\frac{1}{2}$ fathoms water in it, running 2 cables' lengths southward into the bank, beyond which distance there were only 2 to 4 feet water for more than a cables' length in that direction. This, however, in 1863, appears to have become the channel, as it then crossed the Horse Shoe bank.

† **The WESTERN SHORE** of George bay from Clerk point, forms a bight extending S. by W. $\frac{1}{4}$ W. $1\frac{1}{2}$ miles to a projection at a quarter of a mile westward of Atkins point. This bight, which is 4 cables deep, with several ledges of rocks along its north-western shore, is filled with mud-flats covered at half-flood, the eastern edge of which, from Clerk point, trends South, S. $\frac{1}{2}$ W. and S.S.W. $1\frac{1}{2}$ miles to one cable's length off the southern point of the bight, from whence the outer edge of the western mud-flats sweeps round to the shore, at about one-third of a mile to the south-westward of the point.

The outer edge of these flats is steep and regular, except at $1\frac{1}{2}$ cables' lengths north-westward of Pelican point, where a 5-feet spit projects about 100 yards. There are several long narrow ditches running nearly North and South through these flats, the most remarkable of which, from its entrance at a quarter of a mile northward of Atkins point, runs up North to within 2 cables' lengths south-westward of the spit just mentioned ; from 6 feet water in the entrance of this narrow inlet the depths increase to 12 feet near its northern end.

The main channel into George bay from Clerk point, is bounded on the west side by the edge of the mud-flats just described, and on the east side by the Horse Shoe bank, the edge of the shoals northward of Pelican point, and the sand and mud-flats from thence to Atkins point. From Clerk point the channel increases to $1\frac{1}{2}$ cables in width, abreast of the south point of Horse Shoe bank, with 13 to 7 and 9 feet water ; between Pelican point and the 5-feet spit to the north-westward of it, the channel is nearly one cable wide, with 2 to 4 fathoms water. From Pelican point to Atkins point the channel is generally about $1\frac{1}{4}$ cables wide, with an

average depth of 3 fathoms in the fairway ; there are 3 fathoms water within 80 yards of Pelican point, and 4 fathoms close to Atkins point.

EASTERN SHORE.—From a steep point, on which stands the Constable's house, at S.S.W. $\frac{1}{2}$ W. $1\frac{1}{2}$ cables' length from Atkins point, the eastern shore trends S. by W. $\frac{1}{4}$ W. nearly half a mile to the northern extreme of the south-east bight of George bay, which extends from thence S.S.W. $\frac{3}{4}$ W. $1\frac{1}{2}$ miles to a small islet, close to a projecting bend of the shore, at nearly half a mile south-eastward of which is a small lagoon. This bight is bordered by flats, which from its north-eastern point, extend W. by S. four-fifths of a mile ; the western portion of these flats, for a distance of half a mile, being about 2 cables broad and divided by two narrow channels, with 13 to 8 feet water in them. The northern edge of these flats is separated by a narrow channel, from a bank one cable to 100 yards broad, which, from 2 cables' lengths north-westward of the north-eastern point of the bight, extends W.S.W. 4 cables' lengths. Although the narrow channel between this bank and the flats to the southward of it, has 12 to 17 and 11 feet water, it appears too narrow at its western end to have any outlet in that direction. From $1\frac{1}{2}$ cables' lengths southward of the north-eastern point of the bight the flat, which borders the bight, extends 100 yards to 2 cables' lengths from the shore, projecting farthest from the middle of the bight.

From the projection at a quarter of a mile westward of Atkins point the western shore sweeps round $1\frac{1}{10}$ miles in a S.W. by W. direction to the eastern point of the entrance of Moulting bay, between 3 cables' lengths and half a mile eastward of which some rocks lie close to the shore. This forms the southern shore of a hilly promontory, half a mile to one mile broad, projecting $1\frac{1}{2}$ miles from the northward, between Moulting bay and the main channel from the Horse Shoe bank to Atkins point.

The main channel from Atkins point trends in a S.W. and W.S.W. direction $1\frac{1}{4}$ miles to its opening into George bay, and is bounded on the north-western side by the southern edge of the western mud-flats and the shore from thence to the east point of the entrance of Moulting bay, and on the opposite side by the bank and flats before noticed. The channel is 150 yards wide abreast of the Constable's house, with 4 fathoms close to the point on which the house stands ; from thence it increases to a quarter of a mile in width at one-third of a mile farther to the south-westward, between which and its opening into George bay it varies from nearly one cable to a quarter of a mile in width ; with irregular depths of 10 feet to 5 fathoms, the bottom being sand throughout the channel, from the entrance into the bay.

George bay, the eastern and central portion of this extensive land-locked harbour, contains, independently of its south-western and northern

arms, an area of nearly one square mile, with regular depths of 5 to 12 fathoms, over a bottom of sand.

SOUTH-WEST ARM.—From the small islet before noticed at the south-western extreme of the south-east bight of George bay, the south-eastern shore curves in a S.W. $\frac{1}{2}$ S. direction nearly one mile to the south bight of the arm, which extends nine-tenths of a mile from E. $\frac{3}{4}$ N. to W. $\frac{3}{4}$ S., and is one-third of a mile deep. At S.W. half a mile from its eastern point, is a cliffy projection, on which are some farm buildings. From the western point of this bight the shore curves N.W. by N. a quarter of a mile to a projecting point, and from thence nearly half a mile in a W. $\frac{1}{2}$ N. direction to Jasons Gate bridge. Some rocks above water extend about 100 yards from the projecting point. From the islet to the bridge there are 3 fathoms water within a cable's length of the shore.

The land behind this shore is hilly, and at one-third of a mile S.E. of the eastern end of the south bight, rises to the height of 180 feet; there are several small streams in the valleys between these hills, and there are some springs close to the beach, at about half a mile to the south-westward of the small islet before mentioned.

MCDONALD POINT, the north-west entrance point of the South-west arm of George bay, is a sandy projection lying S.W. by S. one mile from the eastern entrance point of Moulting bay, and forming the south-east side of the mouth of George river.

The north-western shore of the South-west arm of George bay, from McDonald point, extends irregularly, half a mile in a S.W. by S. direction to a small islet in the mouth of a narrow creek, trending about N.W. by W. 4 cables' lengths to the foot of a little ridge of hills, which extends from thence nearly one mile in a N.W. by W. $\frac{1}{2}$ W. direction. There is a farm on this ridge at nearly $1\frac{1}{4}$ miles to the westward of McDonald point, with some other buildings on the ridge between the farm and the creek just noticed. At about 1 and $1\frac{1}{4}$ cables' lengths to the south-westward of McDonald point the low land between the south-west arm and George river is intersected by two very narrow creeks trending nearly East and West.

From the islet in the mouth of the creek, before noticed, the north-western shore of the South-west arm of George bay trends in and out, for a distance of three-fifths of a mile in a S.W. by W. $\frac{1}{4}$ W. direction to a low projecting point, on the west side of which, at a quarter of a mile within its extremity, is the mouth of a small stream flowing from the north-westward, and winding along the south-west side of the farm ridge. From the mouth of this stream the shore winds south-westward about three-quarters of a mile to Jasons Gate bridge.

From McDonald point to Jasons Gate bridge the shore appears to be everywhere inaccessible on account of the mud-flats covered at half flood,

which extend a quarter of a mile to half a mile from the shore. The edge of these flats, from about a quarter of a mile N.N.E. of McDonald point, trends E.S.E. 2 cables' lengths, and S.E. by S. 4 cables' lengths to an elbow projecting E. by S. half a mile from McDonald point, and forming between it and the small islet to the south-eastward of it, the entrance into the South-west arm. From this elbow the edge of the mud-flats curves three-fifths of a mile south-westward, and then sweeps round in a S.S.W. and W. $\frac{1}{2}$ S. direction three-quarters of a mile to the east side of the mouth of an inlet, nearly one cable wide, trending N.N.W. $\frac{1}{2}$ W. about a quarter of a mile, and reaching within 150 yards of the shore. From 5 fathoms in the entrance of this inlet the depths in it gradually decrease to 5 feet, at little more than one cable's length from the low point to the northward of it. From the west side of the entrance of this inlet the edge of the mud-flats trends W.S.W. a quarter of a mile, from whence it turns in and out, half a mile in a W. by N. $\frac{1}{2}$ N. direction to within a cable's length of the shore, and terminates at Jasons Gate bridge.

THE OYSTER PATCH is about 100 yards in extent, with 6 feet water on it, from which the cliffy point in the south bight bears S. $\frac{1}{4}$ E. and Jasons Gate bridge W. $\frac{1}{4}$ S.: there are 2 to 5 fathoms water close round the patch, and 3 and 4 fathoms between it and the east side of the entrance of the creek, at $1\frac{1}{2}$ cables' lengths to the north-westward of it. There are some stones on the mud-flat at one-third of a mile to the north-eastward of the patch.

The navigable water in the South-west arm of George bay is half a mile wide at its entrance, from whence it varies from 4 cables' to three-quarters of a mile in width to within two-thirds of a mile of the bridge. There are 11 and 12 fathoms across the entrance, with similar depths up to the Oyster patch, and 9 to 3 fathoms within a cable's length of the southern shore and of the mud-flats, the bottom throughout being mud. The navigable water in the western corner of the arm, for about two-thirds of a mile outside the bridge, is a quarter of a mile broad, with 7 and 8 fathoms close off the rocks which project from the southern shore, from whence the depths gradually decrease towards the bridge, with 3 fathoms within 100 yards of the south shore, and of the mud-flats on the north side.

GEORGE RIVER is one cable wide at its entrance, between McDonald point and the low point to the north-westward of it, but it is fronted by small banks, extending a quarter of a mile to the northward. The river flows from the north-westward to about a cable's length northward of the farm on the ridge, before mentioned, and from thence trends eastward to the entrance. From the entrance to three-quarters of a mile above it, where the river is only 50 yards wide, the depth of water does not exceed 1 to 3 feet.

From the north-west point of the entrance of George river the shore trends W.N.W. a quarter of a mile to a narrow creek, which communicates with the river at one-third of a mile above the entrance, and severs the low point from the more elevated land behind it. From this creek the western shore of George bay extends about half a mile northward to the west entrance point of Moulting bay, and is bordered by a mud-flat, which from one cable's length north-eastward of the creek to the same distance southward of the point, does not extend beyond 150 yards from the shore; the edge of the flat being steep-to, with 2 and 3 fathoms close to it. At a quarter of a mile northward of the creek last noticed, there is a farm close to the shore, from whence a jetty projects nearly to the edge of the flat.

Between the western shore of George bay and the opposite promontory, there is a clear space extending upwards of three-quarters of a mile N.E. and S.W., and half a mile from N.W. to S.E., having 9 and 10 fathoms in the centre, and 5 fathoms within 100 yards of the mud-flats, in which the western portion of this space is embayed.

MOULTING BAY, which is the northern arm of George bay, is three-quarters of a mile across East and West at its entrance, from whence it extends North $1\frac{1}{2}$ miles. From its east entrance point to another projection at half a mile to the northward of it, the shore is steep with $2\frac{1}{2}$ to 4 and 5 fathoms at about 50 yards from it. But with this exception the shores of the bay appear to be inaccessible, especially to the northward and westward, on account of a continuous mud-flat, the edge of which from the north point of the steep eastern shore just mentioned, extends 2 cables' lengths from the shore at three-quarters of a mile farther to the northward. From the northern and western shores the mud-flat extends 1 to $2\frac{1}{2}$ cables' lengths, and from the west entrance point it projects half way across towards the eastern shore, leaving an entrance two-fifths of a mile wide, with $2\frac{1}{4}$ to 9 fathoms water. Within the entrance there is a space one mile long, North and South, and three-quarters of a mile to a quarter of a mile wide, with 5 to 2 fathoms water on a bottom of mud. The north and north-western shores of Moulting bay are low, and intersected by several small streams. On the west side of the entrance the land is hilly and rises to a summit 700 feet high, at W. by N. $1\frac{1}{2}$ miles from the west point of the entrance of the bay.

DIRECTIONS.—Although there is a sufficient space in George bay for a fleet of the largest ships, it is only available for vessels of very light draught, on account of the narrow intricate channel leading into the bay from its outer entrance, and the bars which obstruct the channel, there being only 9 feet water on the Outer bar to the north-westward of Bare Top hill, and uncertain depths in the shifting channels between Dora and Blanche points.

As the Outer entrance of George bay is exposed to the northward and eastward, gales from between these points may naturally be expected to cause heavy breakers upon the Outer bar, when it would appear unsafe for any vessel to attempt to enter ; and even under the most favourable circumstances, there is only a sufficient depth of water in the entrance, for vessels of light draught, there being so little as 8 feet on the bar, at low water.

A vessel, however, adapted to the depth of water on the bar, having, with smooth water and a commanding breeze, approached near enough to the entrance to clearly distinguish Granite Rock point, should bring it to bear S.W. by W., and then steer for it, by keeping it steadily on that bearing, which will lead through the channel between the Middle and North shoals, to about half a cable's length southward of the point: from thence, keep at the distance of about half a cable's length, along the western shore, between Granite Rock and Dora points, and having cleared the small patches close off the latter point, take the channel that may be the most practicable one, either along the western shore, or through the Horse-shoe bank, which a stranger should ascertain before passing Dora point.

From the south extreme of Horseshoe bank the vessel may shape a mid-channel course for Atkins point, keeping midway between Pelican point and the spit to the north-westward of it ; and after passing close to Atkins point and that under the Constable's house, to the south-westward of it, steer from the latter point, in mid-channel between the northern shore and the shoals, immediately to the southward of it, $1\frac{1}{4}$ miles, which will clear the channel into George bay.

TIDES.—It is high water in George bay, full and change, at 9h. 42m. ; springs rise 3 feet, neaps 2 feet.

SLOOP ROCK.—The East coast of Tasmania from Grant point, curves north-westward and northward about $3\frac{1}{2}$ miles to a point, close off which lies Sloop rock. At three-quarters of a mile to the westward of Grant point is the entrance of a lagoon which branches to the south-westward and westward.

Between the point abreast of Sloop rock and another projection at N. by W. $\frac{1}{4}$ W. $2\frac{1}{2}$ miles from it, the coast forms an indentation half a mile deep, with a small double inlet in its south-west corner, and a sunken rock close off its northern point. From the northern point of this bay the coast sweeps round N.N.W. 2 miles to a small inlet, and from thence extends N. $\frac{1}{4}$ W. 5 miles to the entrance of Anson bay.

The GARDENS are some sunken patches which lie near the coast between the northern point of the indentation just noticed, and the small inlet at 2

miles to the northward of it ; but the outermost of these dangers does not appear to extend beyond a mile from the shore.

ANSON BAY has a narrow entrance trending N.W. about a mile into the bay, which forms a lagoon of a triangular shape about 1 mile in extent, its eastern side being only separated from the sea by a narrow barrier, extending $1\frac{1}{2}$ miles from the northward to the entrance of the bay. A small stream flows into the western corner of Anson bay from the southward.

From the entrance of Anson bay the coast curves in a N. by E. $\frac{3}{4}$ E. direction 5 miles to Eddystone point ; there is a bank near the shore midway between the entrance and the point, with 4 fathoms close to the southward of it, and no bottom at 15 fathoms between the bank and Eddystone point.

SOUNDINGS.—From 60 fathoms at 5 miles off St. Helens point, the soundings gradually decrease to 40 fathoms at 3 miles off Eddystone point. Between this line of soundings and the shore for about 5 miles southward from Eddystone point, the soundings range from 33 to 17 fathoms toward the shore.

CHAPTER VIII.

AUSTRALIA.—EAST COAST, CAPE HOWE TO PORT JACKSON.

VARIATION from $10^{\circ} 30'$ to $10^{\circ} 10'$ East, in 1868.

CAPE HOWE.—From two-thirds of a mile N. by E. of the north point of Gabo isle the coast, which consists of low white sand-hillocks, curves N.E. $\frac{1}{4}$ N. 3 miles, to a projection, with a ledge of dry and sunken rocks extending from it, and from thence trends N.E. by N. $1\frac{1}{4}$ miles to Cape Howe, the south-east point of Australia. This cape, which is in lat. $37^{\circ} 30' 15''$ S., long. $149^{\circ} 59'$ E., is a low point of rocks and sand, but it may be known by some round hills in its vicinity, especially by Howe hill, which attains the height of 1,250 feet, at W.S.W. $4\frac{1}{2}$ miles from the extremity of the cape. On the south-west side of Howe hill is a lake of brackish water.*

SOUNDINGS.—There are 54 and 53 fathoms at 3 miles south-eastward, and at $3\frac{1}{2}$ miles eastward of Gabo isle, and 43 fathoms at 2 miles to the eastward of Cape Howe; and from 36 fathoms within a mile of the island the soundings gradually decrease to 13 and 10 fathoms at half a mile off the cape.

From Cape Howe a rocky coast trends N. by W. $\frac{1}{4}$ W. $3\frac{1}{2}$ miles to Black head, and then extends N.N.W. 5 miles to some cliffs of granite and and porphyry, which sweep round in a N.N.E. and N.N.W. direction 5 miles to the southern extreme of a long sandy beach. A barren heath extends from Cape Howe to the cliffs, but these are surmounted by steep grassy hills, bearing gum, oak, and other trees.

BAY CLIFF and WONBOYN RIVER.—Between the southern extreme of the long sandy beach and Green cape, at N.E. by E. $\frac{3}{4}$ E. 5 miles from it, the coast forms a bay $2\frac{1}{2}$ miles deep, which is sometimes a roadstead for coasters. Bay cliff, West $3\frac{1}{4}$ miles from Green cape, is the south head of Wonboyn river, the narrow mouth of which is sometimes fordable for cattle; but the sand is continually shifting.

GREEN CAPE is a smooth sloping point lying nearly N. $\frac{1}{4}$ E. 15 miles from Cape Howe: some sunken rocks lie close to it; but there are 26 and 27 fathoms within a mile of the cape.

* See Chart, Australia, East Coast, Cape Howe to Barriga point, No. 2,141; scale, $\pi = 0.26$ of an inch.

SOUNDINGS.—There is no bottom in 830 fathoms at E.S.E. $7\frac{1}{2}$ miles from Cape Howe; but at E.N.E. 10 miles from the cape there are 66 fathoms, sand and shells, with 47 to 48 fathoms from thence to about $1\frac{1}{2}$ miles off Green cape, and from 13 fathoms at half a mile off the former, to 26 fathoms at a mile off the latter cape there are about 21 to 33 fathoms.

The coast from Green cape trends N.W. by N. 3 miles to Bitangabee inlet, which is a good harbour for small vessels or boats, and from thence N.N.W. $4\frac{1}{2}$ miles to Mowwarry point, close to which are High and other rocks. From hence the coast extends N.W. by W. $3\frac{1}{2}$ miles to Red point, which forms the southern side of the entrance of Twofold bay. The coast from Green cape to Red point is bold and mostly rocky, the land along it being generally barren heath, with good grass on the points; the back country is hilly, but thickly wooded. Haycock hill, at W.S.W. $2\frac{1}{2}$ miles from Mowwarry point, is the highest of these hills; but the most elevated land in this locality is mount Imlay, a very remarkable and densely wooded peak, bearing W. $\frac{3}{4}$ N., distant nearly 16 miles from Green cape.

SOUNDINGS.—There are 50 fathoms at about 6 miles off Green cape, 48 fathoms at 7 miles off Mowwarry point, and 42 fathoms at 8 miles to the north-eastward of Red point, with gradually decreasing depths towards the coast, along which there are 31 to 22 fathoms at 1 mile from the shore.

RED POINT, which may be known by a stone tower on it 66 feet above the level of the sea, has a rock awash close off it, and at a quarter of a mile to the northward of this is a sunken rock, with $3\frac{1}{2}$ fathoms water on it, and 17 and 18 fathoms round it.

TWOFOOLD BAY is not of itself worthy of any particular interest; but as nothing larger than boats can find shelter on any other part of the coast, from Corner inlet, or from the Furneaux group to Jervis bay, in lat. $35^{\circ} 6' S.$, it becomes of importance to whalers and to other ships passing along the coast. It may be known when coming from the southward, by mount Imlay, and when nearer the bay, by the land behind it, consisting more of hillocks than elsewhere.*

The entrance of Twofold bay is $2\frac{3}{4}$ miles wide from Red point N.N.W. to Worang point, close off which lie the Mewstone and another rock above water. There are 10 fathoms water at about a quarter of a mile off Red point, and 17 to 20 fathoms in the middle of the entrance, with regular soundings in 17 to 15 fathoms across the bay for nearly $1\frac{1}{2}$ miles farther in.

LOOKOUT POINT and LIGHT-HOUSE.—Twofold bay is divided into two bights by Lookout point, a rocky peninsula one-third of a mile broad,

* See Plan of Twofold bay.

apparently blocked up, and bearing N.W. by W. $\frac{1}{2}$ W., distant $1\frac{1}{4}$ miles from Worang point.

CURALO LAGOON is an extensive sheet of salt water, which from its entrance trends, with gradually increasing width, about 1 mile to the south-westward, where it is half a mile wide, with a branch extending into the thickly timbered land to the north-westward. This lagoon is only separated from the north-western shore of Calli bay by a low narrow tongue of land.

TALLUNGO COVE is a small inlet on the north-east side of the isthmus which connects Lookout point with the main-land; some dry and sunken rocks extend across the entrance of the cove, and a reef borders the shore immediately to the northward of it.

All the points which project into Twofold bay are the terminations of thickly timbered ranges of hills, with numerous creeks and lagoons between them, most of which have salt, or brackish water.

PILOTS.—Twofold bay has a pilot establishment; and on a vessel making the usual signal, she will be boarded by a pilot as soon as practicable.

SIGNALS in use at the bar harbours on the east coast, North of Port Jackson :—

No. 1. A flag at the south yard arm.	You may approach with safety.
2. A flag at the north yard arm.	Stand in.
3. Two flags at the south yard arm.	Stand in — the pilot has left to board you.
4. A flag at each yard arm. —	If the pilot cannot board you, the boat will be inside the bar—steer for her.
5. A flag over a ball at the south yard arm.	A boat will be sent off immediately.
6. A ball over a flag at the north yard arm.	A boat will be sent off when practicable.
7. A ball over two flags at the south yard arm.	The flood tide has commenced.
8. Two balls over a flag at the north yard arm.	The ebb tide has commenced.
9. A ball at the south yard arm.	There is too much sea on the bar to send a boat.
10. A ball at the north yard arm.	Stand off.
11. Two balls at the south yard arm.	It blows too hard to send a boat.
12. A ball at each yard arm. —	The pilot cannot board you—stand off and on until morning.

Note.—To be a *red* flag in each case.

The day signal for a pilot to be made on board a vessel is the Union jack at the fore ; and the night signal, burning a blue-light or firing a gun or rocket. Care must be taken to prevent anything liable to be mistaken for a *white* flag being displayed, as a *white* flag at the mast-head is the signal that a pilot is not required, the vessel being exempt by law, from the compulsory necessity of taking a pilot. Vessels likely to communicate with any of the ports along the East coast, should be provided with the above signals ; although Marryat's code is much used at the signal-stations along the coast.

The following is an extract from the Pilotage Act, showing what vessels are exempt :—" Vessels of all nations outfitting to, or refitting from the fisheries, and all vessels arriving and sailing in ballast, or which may not break bulk or only to such an extent as may be necessary to provide funds for the repairs or refreshments required. All ships, vessels, and steamers employed in the coasting trade, all ships or vessels trading between any port of New South Wales and any of the Australian colonies or New Zealand, and vessels under 25 tons register measurement, are exempt from pilotage, unless the services of a pilot have been actually required and received."—7 Victoria, No. 12, Schedule A. ; and 8 Victoria, No. 16, Sections 9, 10, and 11. , Vessels above 25, but under 50, tons burden are not required to take pilots ; but, unless exempt as above, though they decline taking them, they are chargeable with half pilotage.—7 Victoria, No. 12, Schedule A. Every vessel that actually takes a pilot must pay full pilotage.—7 Victoria, No. 12, Schedule A.

DIRECTIONS.—Twofold bay is so open to seaward and is so free from detached dangers, that there is very little difficulty in entering it. On approaching the bay, care should be taken to avoid the sunken rock which lies nearly one-third of a mile to the northward of Red point, and having distinctly made out the light-house and other objects, the ruins of the tower on the east side of East Boyd kept on a S.W. by W. bearing will lead in through the middle of the bay, when a vessel may anchor either in Snug cove off the township of Eden, or in either of the anchorages off East or West Boyd, according to the prevailing wind, or as most convenient.

In entering Snug cove with a southerly wind, care must be taken to shorten sail in good time and to drop the anchor in 6 or 5 fathoms, before Red point comes on with the south extreme of Lookout point, and in veering cable the lead should be hove over the stern of the vessel. There is room for two or three small vessels in Snug cove, but not for more.

A vessel seeking shelter in Twofold bay from a south-easterly gale, will find the anchorage off East or West Boyd, on the south side of the bay, far preferable to Snug cove ; and it is by no means certain that it is not so even with an easterly gale. Captain Stokes, in *H.M.S. Beagle*, found

the southern part of Nullica bay, off West Boyd, a very convenient anchorage, and which, he says, was the constant resort of coasters.

CUSTOM HOUSE.—Twofold bay is now a place of considerable importance, and is the principal port of outlet for the trade of the Maneroo district. A custom house has been established here, and the usual regulations must be observed, and the rates paid as at other ports of entry and discharge in the Colony, should a vessel break bulk or land passengers.

Supplies.—Wood in abundance can be procured in all parts of Twofold bay, and water may be obtained at Eden, and also on the south side of the bay at East Boyd. The ponds and lagoons, which are to be found at the back of most of the beaches, are frequented by ducks, teal, herons, red-bills, and some small flights of curlew and plover; and the bay appeared to be well stocked with fish.

TIDES.—It is high water in Twofold bay, full and change, at 10h. 0m.; springs rise 7 feet, neaps 3 feet.

The COAST from Worang point trends N. by W. $\frac{1}{2}$ W. 2 miles to a point having close in front of it Bullara islet, which is flat, with a reef projecting a short distance from its north extreme. From this islet the shore curves N.W. by N. $2\frac{1}{4}$ miles to the red Quondolo cliffs, and from thence North $2\frac{1}{4}$ miles to a low point, connected by a reef of rocks with Haystack islet, which lies close off the point. A succession of rocky points from Haystack islet sweeps round north-westward and westward 1 mile to the entrance of Panbula river. The most elevated land between Twofold bay and this river is mount Robinson, at 4 miles to the north-westward of Worang point.

PANBULA RIVER, which is only available for boats and small craft, is about 1 or 2 cables wide, and trends south-westward nearly 2 miles into Panbula lake, which is about $1\frac{1}{2}$ miles in extent, with several small streams flowing into it. The village of Panbula, at about $2\frac{1}{2}$ miles to the westward of the entrance of the river, is situated near the Walker branch, which flows into the lake from the westward, between Melton hill to the northward, and Mowbray range to the southward of it.

MURRIMBULA POINT and LAKE.—From the entrance of Panbula river a sandy beach curves 3 miles northward to the entrance of Murrimbula lake, which has a weekly steam communication with Sydney. The entrance is very narrow, but is apparently protected from the northward by Murrimbula point, a tongue of land projecting S.E. 1 mile from the north side of the entrance. Murrimbula lake is somewhat of a triangular form and about $1\frac{1}{2}$ miles in extent, its eastern side being separated from the sea by a narrow sandy flat, covered with scrub.

TURA HEAD.—At N.N.W. 1 mile from Murrimbula point is Panbulo inlet, from whence the coast extends N.N.E. $1\frac{3}{4}$ miles to Tura head,

between which and Taringal point, at N. $\frac{1}{2}$ E. 4 miles from the head, is a bay $1\frac{1}{2}$ miles deep, divided midway by Bourda point, close behind which is a salt-water pool. Walligal lake, which lies W. by S. between 1 and 2 miles from Taringal point, is also salt, and is only separated from the shore of the bay by a narrow ridge, without any apparent opening.

MASSEY PEAK.—From Panbulo inlet to Bourda point the coast consists of sandstone and pipeclay cliffs, with grassy headlands and low scrubby ranges behind. The most remarkable hill behind this part of the coast appears to be Massey peak, a tickly wooded mountain 2,220 feet high, bearing W. by S., distant $10\frac{1}{2}$ miles from Tura head.

TATHRA HEAD.—From Taringal point, which has a small islet and sunken rocks close in front of it, an uneven line of granite and pipeclay cliffs, with grassy land over them, and dry and sunken rocks along their base, extends N. $\frac{1}{2}$ E. 4 miles to Tathra head, between which and Wajurda point, at N. $\frac{1}{4}$ W. $2\frac{1}{2}$ miles from the head, is an exposed bay about three-quarters of a mile deep.

MOGAREKA INLET and BEGA RIVER.—At $1\frac{1}{2}$ miles to the south-westward of Wajurda point is Mogareka inlet, the mouth of Bega river, which is sometimes open, with 6 feet water on the bar. Close within its mouth, where there is a small islet, this inlet forms three branches, two of which trend to the southward, whilst the main branch winds S.W. and S.E. about $2\frac{1}{2}$ miles to two small islets, above which the river winds between the ranges of hills, from the westward. Between Tathra head and Mogareka inlet the shore is low and sandy; but between the inlet and Wajurda point the land is more elevated, and has some rocks close to the shore.

TARONDA INLET.—A rocky projection at half a mile to the northward of Wajurda point, forms the south side of the mouth of Taronda inlet, which is dangerous even for boats, as it is very narrow, and there are sunken rocks on either side of it. From this inlet a beach extends N. by E. $2\frac{1}{4}$ miles to Tanja creek, and at N. by E. 1 mile from this creek is Bithry inlet, which is not fordable.

BUNGA HEAD.—From Bithry inlet the coast consists of a series of small projecting rocky points extending irregularly, N.N.E. $\frac{1}{2}$ E. $2\frac{1}{2}$ miles to Bunga head, close off which lies Mimosa rock, so called from the steamer *Mimosa* having been wrecked on it in 1868. From hence the coast trends N. by W. $2\frac{1}{4}$ miles to a rocky point, on the west side of which is Erungona creek. The coast from Bithry inlet to Erungona creek is closely bordered with dry and sunken rocks, except at about $1\frac{1}{2}$ miles to the south-westward of Bunga head, where there appears to be a sandy beach nearly half a mile long.

THUBBA INLET and RIVER.—From Erungona creek a low sandy beach curves North one mile to Thubba inlet, the estuary of the river of

the same name. This inlet is very narrow and fordable at its mouth, within which it is 2 or 3 cables wide, and trends about W.S.W. two-thirds of a mile to where the river winds into it from the north-westward. At about $2\frac{1}{2}$ miles above the mouth of the inlet the water is said to be fresh.

MOUNT TOWNSEND.—The land between Mogareka and Thubba inlets is generally poor, with high scrubby hills, destitute of grass. Mount Townsend, W. $\frac{1}{2}$ N. $9\frac{1}{2}$ miles from Bunga head, is the summit of a high thickly timbered range, very remarkable from seaward. From about 2 miles southward of this mountain, one ridge trends in a W. by N. direction, whilst others branch off to the south-eastward and eastward, terminating at Wajurda point and at other points of the coast between Tanja and Erungona creeks.

SOUNDINGS.—There are 65 fathoms, sand, at about 15 miles off Twofold bay, and 90 fathoms at the same distance off Bunga head, from which depths the soundings decrease with some regularity towards the land. From 5 miles north-eastward of Twofold bay to about the same distance to the north-eastward of Thubba inlet, there are 35 to 51 fathoms, at an average distance of 5 miles from the shore.

BARRIGA POINT, — BURRIGUT ROCKS.—Barriga point, in lat. $36^{\circ} 31'$ S., long. $150^{\circ} 4'$ E., is the central of a series of small rocky points, bordered with sunken rocks, which from Thubba inlet, sweep round in a N.N.E. and N.W. by N. direction $2\frac{1}{2}$ miles to a salt lagoon close to the shore, from whence a sandy beach trends N. $\frac{1}{2}$ E. nearly 2 miles to Jerimbut point, which has a reef of sunken rocks projecting from it, and is fronted by the three Burrigut rocks, above water.*

BURMAGHOU INLET.—The coast from Jerimbut point extends nearly N. $\frac{3}{4}$ E. $2\frac{1}{4}$ miles to a rocky projection, at three-quarters of a mile to the westward of which is Burmaghou inlet, across the narrow entrance of which is a 6-foot bar, with apparently some sunken rocks close off the eastern point of the entrance. This inlet appears to be much encumbered by two islets or banks, lying in it, one being close within the entrance, and the other at about half a mile farther to the westward.

TIDES.—It is high water on Burmaghou bar, full and change, at 9h. 20m.; rise 5 feet.

For the first two miles northward of Thubba inlet the country is good for cattle, but from thence to Burmaghou inlet there are thick scrub and forest.

From Burmaghou inlet a low sandy beach, backed by a swamp, curves North $2\frac{1}{2}$ miles to the southern of the two rocky Murrinna points, lying three-quarters of a mile apart. Close behind the beach, at a quarter of a

* See Chart of Australia, East Coast, Barriga point to Jervis bay, No. 2,142; scale, $m = 0.26$ of an inch.

mile to the westward of the northern of these two points, is Walluga lagoon, the water of which is salt. From hence a sandy beach, backed by good pasture, with plenty of fresh water, extends N.N.E. $\frac{1}{2}$ E. nearly 3 miles to a double point, at N.N.E. $\frac{1}{4}$ E. 2 miles from which is cape Dromedary.

MOUNT DROMEDARY, the most remarkable object on this part of the coast, is a double mountain 2,700 feet high, in lat. $36^{\circ} 18' 45''$ E., long. $150^{\circ} 2'$ E., which from its figure, was named by Captain Cook mount Dromedary; it stands $3\frac{1}{2}$ miles back from the coast, with a hill 650 feet high, between them.

CAPE DROMEDARY, which lies E. by N. $\frac{1}{2}$ N. $5\frac{1}{4}$ miles from the mountain of the same name, is the easternmost of a series of granite and ironstone points, extending from $1\frac{1}{2}$ miles S.S.W. $\frac{1}{2}$ W. of the cape to Barbunga lagoon, at N.N.W. $\frac{1}{2}$ W. one mile from it. Several rocks lie along these points, and between cape Dromedary and Barbunga lagoon, reefs of dry and sunken rocks project some distance from the shore.

NUCKET POINT.—From Barbunga lagoon a sandy shore, with some sunken rocks close to it, trends nearly N.N.E. $1\frac{3}{4}$ miles to Nugget point, from which a succession of granite and ironstone points and small sandy bays extends nearly N.N.W. $3\frac{1}{2}$ miles to Wagonga inlet. Nugget point and the other projections between it and Wagonga inlet, are bordered with reefs. Between Barbunga lagoon and Wagonga inlet there is good grazing country along the headlands, but it is intersected by salt and brackish lagoons, and some parts are thickly wooded.

MONTAGU ISLE, E. by N. $\frac{1}{2}$ N. $3\frac{3}{4}$ miles from Nugget point, is one mile long, N.N.W. and S.S.E., one-third of a mile broad, and 210 feet high, with sunken rocks extending from its northern and southern extremes. There are 12 fathoms near the west side of the island, where a vessel may anchor, but on a rocky bottom.

SOUNDINGS.—From 5 miles off Thubba inlet to about one mile westward of Montagu isle, the soundings range from 51 to 17 fathoms, on a sandy bottom; but at 7 miles south-eastward of the island there is no bottom at 100 fathoms.

WAGONGA INLET has a narrow entrance, sometimes accessible to small vessels, but there is generally a heavy break across it. Within the entrance this inlet extends about $1\frac{1}{2}$ miles to the south-westward, with several creeks branching to the northward and southward, and an islet, or bank in the middle of it, between which and the south-eastern bight of the inlet is the anchorage for such small vessels as may enter.

YELLOW HEAD.—MARIA POINT.—From Wagonga inlet the coast consists of sandy beaches and rocky points, mostly bordered by reefs, extending nearly N. $\frac{3}{4}$ W. 3 miles to Yellow head, on the north side of

the same name. This inlet is very narrow and fordable at its mouth, within which it is 2 or 3 cables wide, and trends about W.S.W. two-thirds of a mile to where the river winds into it from the north-westward. At about $2\frac{1}{2}$ miles above the mouth of the inlet the water is said to be fresh.

MOUNT TOWNSEND.—The land between Mogareka and Thubba inlets is generally poor, with high scrubby hills, destitute of grass. Mount Townsend, W. $\frac{1}{2}$ N. $9\frac{1}{2}$ miles from Bunga head, is the summit of a high thickly timbered range, very remarkable from seaward. From about 2 miles southward of this mountain, one ridge trends in a W. by N. direction, whilst others branch off to the south-eastward and eastward, terminating at Wajurda point and at other points of the coast between Tanja and Erungona creeks.

SOUNDINGS.—There are 65 fathoms, sand, at about 15 miles off Twofold bay, and 90 fathoms at the same distance off Bunga head, from which depths the soundings decrease with some regularity towards the land. From 5 miles north-eastward of Twofold bay to about the same distance to the north-eastward of Thubba inlet, there are 35 to 51 fathoms, at an average distance of 5 miles from the shore.

BARRIGA POINT, — BURRIGUT ROCKS.—Barriga point, in lat. $36^{\circ} 31'$ S., long. $150^{\circ} 4'$ E., is the central of a series of small rocky points, bordered with sunken rocks, which from Thubba inlet, sweep round in a N.N.E. and N.W. by N. direction $2\frac{1}{2}$ miles to a salt lagoon close to the shore, from whence a sandy beach trends N. $\frac{1}{2}$ E. nearly 2 miles to Jerimbut point, which has a reef of sunken rocks projecting from it, and is fronted by the three Burrigut rocks, above water.*

BURMAGHOU INLET.—The coast from Jerimbut point extends nearly N. $\frac{3}{4}$ E. $2\frac{1}{4}$ miles to a rocky projection, at three-quarters of a mile to the westward of which is Burmaghou inlet, across the narrow entrance of which is a 6-foot bar, with apparently some sunken rocks close off the eastern point of the entrance. This inlet appears to be much encumbered by two islets or banks, lying in it, one being close within the entrance, and the other at about half a mile farther to the westward.

TIDES.—It is high water on Burmaghou bar, full and change, at 9h. 20m.; rise 5 feet.

For the first two miles northward of Thubba inlet the country is good for cattle, but from thence to Burmaghou inlet there are thick scrub and forest.

From Burmaghou inlet a low sandy beach, backed by a swamp, curves North $2\frac{1}{2}$ miles to the southern of the two rocky Murrinna points, lying three-quarters of a mile apart. Close behind the beach, at a quarter of a

* See Chart of Australia, East Coast, Barriga point to Jervis bay, No. 2,142; scale, $\frac{1}{100000}$ = 0.26 of an inch.

mile to the westward of the northern of these two points, is Walluga lagoon, the water of which is salt. From hence a sandy beach, backed by good pasture, with plenty of fresh water, extends N.N.E. $\frac{1}{2}$ E. nearly 3 miles to a double point, at N.N.E. $\frac{1}{4}$ E. 2 miles from which is cape Dromedary.

MOUNT DROMEDARY, the most remarkable object on this part of the coast, is a double mountain 2,700 feet high, in lat. $36^{\circ} 18' 45''$ E., long. $150^{\circ} 2'$ E., which from its figure, was named by Captain Cook mount Dromedary; it stands $3\frac{1}{2}$ miles back from the coast, with a hill 650 feet high, between them.

CAPE DROMEDARY, which lies E. by N. $\frac{1}{2}$ N. $5\frac{1}{4}$ miles from the mountain of the same name, is the easternmost of a series of granite and ironstone points, extending from $1\frac{1}{2}$ miles S.S.W. $\frac{1}{2}$ W. of the cape to Barbunga lagoon, at N.N.W. $\frac{1}{2}$ W. one mile from it. Several rocks lie along these points, and between cape Dromedary and Barbunga lagoon, reefs of dry and sunken rocks project some distance from the shore.

NUCKET POINT.—From Barbunga lagoon a sandy shore, with some sunken rocks close to it, trends nearly N.N.E. $1\frac{3}{4}$ miles to Nucket point, from which a succession of granite and ironstone points and small sandy bays extends nearly N.N.W. $3\frac{1}{2}$ miles to Wagonga inlet. Nucket point and the other projections between it and Wagonga inlet, are bordered with reefs. Between Barbunga lagoon and Wagonga inlet there is good grazing country along the headlands, but it is intersected by salt and brackish lagoons, and some parts are thickly wooded.

MONTAGU ISLE, E. by N. $\frac{1}{2}$ N. $3\frac{3}{4}$ miles from Nucket point, is one mile long, N.N.W. and S.S.E., one-third of a mile broad, and 210 feet high, with sunken rocks extending from its northern and southern extremes. There are 12 fathoms near the west side of the island, where a vessel may anchor, but on a rocky bottom.

SOUNDINGS.—From 5 miles off Thubba inlet to about one mile westward of Montagu isle, the soundings range from 51 to 17 fathoms, on a sandy bottom; but at 7 miles south-eastward of the island there is no bottom at 100 fathoms.

WAGONGA INLET has a narrow entrance, sometimes accessible to small vessels, but there is generally a heavy break across it. Within the entrance this inlet extends about $1\frac{1}{2}$ miles to the south-westward, with several creeks branching to the northward and southward, and an islet, or bank in the middle of it, between which and the south-eastern bight of the inlet is the anchorage for such small vessels as may enter.

YELLOW HEAD.—MARKA POINT.—From Wagonga inlet the coast consists of sandy beaches and rocky points, mostly bordered by reefs, extending nearly N. $\frac{3}{4}$ W. 3 miles to Yellow head, on the north side of

the same name. This inlet is very narrow and fordable at its mouth, within which it is 2 or 3 cables wide, and trends about W.S.W. two-thirds of a mile to where the river winds into it from the north-westward. At about $2\frac{1}{2}$ miles above the mouth of the inlet the water is said to be fresh.

MOUNT TOWNSEND.—The land between Mogareka and Thubba inlets is generally poor, with high scrubby hills, destitute of grass. Mount Townsend, W. $\frac{1}{2}$ N. $9\frac{1}{2}$ miles from Bunga head, is the summit of a high thickly timbered range, very remarkable from seaward. From about 2 miles southward of this mountain, one ridge trends in a W. by N. direction, whilst others branch off to the south-eastward and eastward, terminating at Wajurda point and at other points of the coast between Tanja and Erungona creeks.

SOUNDINGS.—There are 65 fathoms, sand, at about 15 miles off Twofold bay, and 90 fathoms at the same distance off Bunga head, from which depths the soundings decrease with some regularity towards the land. From 5 miles north-eastward of Twofold bay to about the same distance to the north-eastward of Thubba inlet, there are 35 to 51 fathoms, at an average distance of 5 miles from the shore.

BARRIGA POINT.—BURRIGUT ROCKS.—Barriga point, in lat. $36^{\circ} 31'$ S., long. $150^{\circ} 4'$ E., is the central of a series of small rocky points, bordered with sunken rocks, which from Thubba inlet, sweep round in a N.N.E. and N.W. by N. direction $2\frac{1}{2}$ miles to a salt lagoon close to the shore, from whence a sandy beach trends N. $\frac{1}{2}$ E. nearly 2 miles to Jerimbut point, which has a reef of sunken rocks projecting from it, and is fronted by the three Burrigut rocks, above water.*

BURMAGHON INLET.—The coast from Jerimbut point extends nearly N. $\frac{3}{4}$ E. $2\frac{1}{4}$ miles to a rocky projection, at three-quarters of a mile to the westward of which is Burmaghon inlet, across the narrow entrance of which is a 6-foot bar, with apparently some sunken rocks close off the eastern point of the entrance. This inlet appears to be much encumbered by two islets or banks, lying in it, one being close within the entrance, and the other at about half a mile farther to the westward.

TIDES.—It is high water on Burmaghon bar, full and change, at 9h. 20m.; rise 5 feet.

For the first two miles northward of Thubba inlet the country is good for cattle, but from thence to Burmaghon inlet there are thick scrub and forest.

From Burmaghon inlet a low sandy beach, backed by a swamp, curves North $2\frac{1}{4}$ miles to the southern of the two rocky Murrinna points, lying three-quarters of a mile apart. Close behind the beach, at a quarter of a

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mile to the westward of the northern of these two points, is Walluga lagoon, the water of which is salt. From hence a sandy beach, backed by good pasture, with plenty of fresh water, extends N.N.E. $\frac{1}{2}$ E. nearly 3 miles to a double point, at N.N.E. $\frac{1}{4}$ E. 2 miles from which is cape Dromedary.

MOUNT DROMEDARY, the most remarkable object on this part of the coast, is a double mountain 2,700 feet high, in lat. $36^{\circ} 18' 45''$ E., long. $150^{\circ} 2'$ E., which from its figure, was named by Captain Cook mount Dromedary; it stands $3\frac{1}{2}$ miles back from the coast, with a hill 650 feet high, between them.

CAPE DROMEDARY, which lies E. by N. $\frac{1}{2}$ N. $5\frac{1}{4}$ miles from the mountain of the same name, is the easternmost of a series of granite and ironstone points, extending from $1\frac{1}{2}$ miles S.S.W. $\frac{1}{2}$ W. of the cape to Barbunga lagoon, at N.N.W. $\frac{1}{2}$ W. one mile from it. Several rocks lie along these points, and between cape Dromedary and Barbunga lagoon, reefs of dry and sunken rocks project some distance from the shore.

NUGGET POINT.—From Barbunga lagoon a sandy shore, with some sunken rocks close to it, trends nearly N.N.E. $1\frac{3}{4}$ miles to Nugget point, from which a succession of granite and ironstone points and small sandy bays extends nearly N.N.W. $3\frac{1}{2}$ miles to Wagonga inlet. Nugget point and the other projections between it and Wagonga inlet, are bordered with reefs. Between Barbunga lagoon and Wagonga inlet there is good grazing country along the headlands, but it is intersected by salt and brackish lagoons, and some parts are thickly wooded.

MONTAGU ISLE, E. by N. $\frac{1}{2}$ N. $3\frac{3}{4}$ miles from Nugget point, is one mile long, N.N.W. and S.S.E., one-third of a mile broad, and 210 feet high, with sunken rocks extending from its northern and southern extremes. There are 12 fathoms near the west side of the island, where a vessel may anchor, but on a rocky bottom.

SOUNDINGS.—From 5 miles off Thubba inlet to about one mile westward of Montagu isle, the soundings range from 51 to 17 fathoms, on a sandy bottom; but at 7 miles south-eastward of the island there is no bottom at 100 fathoms.

WAGONGA INLET has a narrow entrance, sometimes accessible to small vessels, but there is generally a heavy break across it. Within the entrance this inlet extends about $1\frac{1}{2}$ miles to the south-westward, with several creeks branching to the northward and southward, and an islet, or bank in the middle of it, between which and the south-eastern bight of the inlet is the anchorage for such small vessels as may enter.

YELLOW HEAD.—MARIA POINT.—From Wagonga inlet the coast consists of sandy beaches and rocky points, mostly bordered by reefs, extending nearly N. $\frac{3}{4}$ W. 3 miles to Yellow head, on the north side of

the same name. This inlet is very narrow and fordable at its mouth, within which it is 2 or 3 cables wide, and trends about W.S.W. two-thirds of a mile to where the river winds into it from the north-westward. At about $2\frac{1}{2}$ miles above the mouth of the inlet the water is said to be fresh.

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BURMAGHOU INLET.—The coast from Jerimbut point extends nearly N. $\frac{3}{4}$ E. $2\frac{1}{4}$ miles to a rocky projection, at three-quarters of a mile to the westward of which is Burmaghou inlet, across the narrow entrance of which is a 6-foot bar, with apparently some sunken rocks close off the eastern point of the entrance. This inlet appears to be much encumbered by two islets or banks, lying in it, one being close within the entrance, and the other at about half a mile farther to the westward.

TIDES.—It is high water on Burmaghou bar, full and change, at 9h. 20m.; rise 5 feet.

For the first two miles northward of Thubba inlet the country is good for cattle, but from thence to Burmaghou inlet there are thick scrub and forest.

From Burmaghou inlet a low sandy beach, backed by a swamp, curves North $2\frac{1}{2}$ miles to the southern of the two rocky Murrinna points, lying three-quarters of a mile apart. Close behind the beach, at a quarter of a

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mile to the westward of the northern of these two points, is Walluga lagoon, the water of which is salt. From hence a sandy beach, backed by good pasture, with plenty of fresh water, extends N.N.E. $\frac{1}{2}$ E. nearly 3 miles to a double point, at N.N.E. $\frac{1}{4}$ E. 2 miles from which is cape Dromedary.

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CAPE DROMEDARY, which lies E. by N. $\frac{1}{2}$ N. $5\frac{1}{4}$ miles from the mountain of the same name, is the easternmost of a series of granite and ironstone points, extending from $1\frac{1}{2}$ miles S.S.W. $\frac{1}{2}$ W. of the cape to Barbunga lagoon, at N.N.W. $\frac{1}{2}$ W. one mile from it. Several rocks lie along these points, and between cape Dromedary and Barbunga lagoon, reefs of dry and sunken rocks project some distance from the shore.

NUCKET POINT.—From Barbunga lagoon a sandy shore, with some sunken rocks close to it, trends nearly N.N.E. $1\frac{3}{4}$ miles to Nugget point, from which a succession of granite and ironstone points and small sandy bays extends nearly N.N.W. $3\frac{1}{2}$ miles to Wagonga inlet. Nugget point and the other projections between it and Wagonga inlet, are bordered with reefs. Between Barbunga lagoon and Wagonga inlet there is good grazing country along the headlands, but it is intersected by salt and brackish lagoons, and some parts are thickly wooded.

MONTAGU ISLE, E. by N. $\frac{1}{2}$ N. $3\frac{3}{4}$ miles from Nugget point, is one mile long, N.N.W. and S.S.E., one-third of a mile broad, and 210 feet high, with sunken rocks extending from its northern and southern extremes. There are 12 fathoms near the west side of the island, where a vessel may anchor, but on a rocky bottom.

SOUNDINGS.—From 5 miles off Thubba inlet to about one mile westward of Montagu isle, the soundings range from 51 to 17 fathoms, on a sandy bottom; but at 7 miles south-eastward of the island there is no bottom at 100 fathoms.

WAGONGA INLET has a narrow entrance, sometimes accessible to small vessels, but there is generally a heavy break across it. Within the entrance this inlet extends about $1\frac{1}{2}$ miles to the south-westward, with several creeks branching to the northward and southward, and an islet, or bank in the middle of it, between which and the south-eastern bight of the inlet is the anchorage for such small vessels as may enter.

YELLOW HEAD.—MARKA POINT.—From Wagonga inlet the coast consists of sandy beaches and rocky points, mostly bordered by reefs, extending nearly N. $\frac{3}{4}$ W. 3 miles to Yellow head, on the north side of

which is Muunga lake, a salt lagoon, about a quarter of a mile wide, trending to the westward. A low sandy beach from Yellow head, extends N. by W. $\frac{1}{2}$ W. $1\frac{3}{4}$ miles to Burra lake, which is about three-quarters of a mile in extent, and from thence N. $\frac{1}{2}$ E. $1\frac{1}{4}$ miles to a smaller lagoon, at N. by E. $\frac{1}{2}$ E. half a mile from which is Marka point: the coast from this lagoon to Marka point and for about a mile to the north-westward of it, is bordered with sunken rocks. Although the country from Wagonga inlet to Marka point is partly covered with scrub and is intersected by salt lagoons, it affords good pasture along the headlands.

BOOGON INLET and TUROS RIVER.—At about three-quarters of a mile to the north-westward of Marka point is a small hilly projection, from whence a low narrow tongue of land extends North three-quarters of a mile to the mouth of Boogon inlet, which does not appear more than one cable wide, and is sometimes closed; but after heavy rains it is open, and only fordable at low water. Within its entrance Boogon inlet forms a labyrinth of points, creeks, and islets, extending about 3 miles North and South, and East and West. At 3 miles westward of its entrance, Boogon inlet receives the waters of Turos river, a considerable stream winding from the south-westward, through a good cattle country, over which there are several stations.

BINGY POINT.—From a small opening at one mile northward of Boogon inlet, a sandy beach, with scrubby land behind it, trends N. by E. $\frac{3}{4}$ E. $2\frac{1}{2}$ miles to a rocky projection, at one mile to the northward of which is Bingy point; both points have reefs of rocks projecting from them. From Bingy point a succession of small bays and rocky points curves round N.W. $1\frac{1}{4}$ miles and N. by E. $1\frac{3}{4}$ miles to Congar creek, a narrow inlet, with a sunken rock close to its mouth.

PETRO HEAD or BLACK ROCK.—A sandy beach from this creek, trends N.W. $\frac{1}{2}$ N. three-quarters of a mile to Petro head, or Black rock, from which a reef, with only 4 feet water on some parts, projects E.N.E. three-quarters of a mile; and from this reef a rocky ledge extends north-eastward to abreast of Torogy point, which lies $1\frac{3}{4}$ miles to the northward of Petro head; there are only 5 fathoms water on some parts of this ledge. The sea always breaks on the reef, and with strong south-easterly gales, it breaks heavily on some patches of the ledge, which would be dangerous to a small deeply-laden vessel, or might cause a large one to strike the ground in the hollow of the sea, which sometimes runs here in a heavy south-east gale. From Petro head the beach continues in a N. by W. $\frac{1}{2}$ W. direction $1\frac{1}{2}$ miles to the southern base of Torogy point, a peninsular headland forming the southern side of the entrance of Moruya river. Between Bingy and Torogy points there are good grassy headlands, with salt lagoons and scrub between them; near the latter point *there are some forest gum and swamp oak trees besides scrub.*

TOROGY POINT and MORUYA RIVER.—Torogy point, in lat. $35^{\circ} 55' S.$, long. $150^{\circ} 10' 15'' E.$, is the north-east extreme of a rocky peninsula, with some grassy slopes on its northern side, extending nearly half a mile from E.N.E. to W.S.W.; there are some rocks above water close off the north-east extreme, within 100 yards of which there are 5 and 6 fathoms water. On the western point or inner south head of this peninsula there is a pilot station, with a signal-staff.*

Moruya river forms a bar harbour, of which the narrowest part of the entrance lies between the west extreme of Torogy peninsula and a low point at about 2 cables' lengths to the north-westward of it; but the channel is contracted to barely 100 yards in width by the North spit, which projects southward and eastward from the low north-western point to within 130 yards of the rocks under the signal-station. From 6 fathoms at one cable's length northward of the north-east point of the peninsula, the water decreases to 8 feet at about one cable's length from the shore, midway between the north-east and west points. From thence to the narrow part of the entrance, between the signal-staff and the North spit, there are irregular depths of 7 to 14 feet at about a cable's length to 100 yards from the shore. At N. by W. $\frac{1}{4}$ W. 100 yards from the signal-staff is a small rock above water, close outside which there are only 3 feet water.

From the west point of Torogy peninsula its rocky and sandy western shore trends nearly S.S.E. 2 cables' lengths to its south-west point; from whence the western shore of the isthmus, which connects the peninsula with the land to the southward of it, curves one-third of a mile southward to a small creek; from whence the southern shore of Moruya river, consisting of a low sandy beach, with rocky points projecting from it, extends West nearly a mile to a creek, bearing S.W. by W. $\frac{1}{2}$ W., distant a little less than a mile from the signal-staff. There is a garden, with some buildings, along the west side of the isthmus, and at the back of the southern shore of the river the land, from a swampy sand-flat, rises westward to sandy ranges of no great height, covered with gum trees, oak, and scrub.

SOUTHERN FLATS.—The bight formed by the eastern and southern shores, between the western extreme of Torogy peninsula and the creek, at about a mile south-westward of the signal-staff, is nearly occupied by two shoal flats, separated from each other by a narrow opening, too shallow even for boats, trending S.S.W. $\frac{1}{2}$ W. from the direction of the signal-staff; but there is a boat channel, 50 to 20 yards wide, between the eastern flat and the west side of the isthmus.

* Described from the Plan of Torogy point and Moruya river, executed in 1864, by E. O. Moriarty Esq., Engineer-in-Chief of Harbours and Rivers in New South Wales; scale, $\frac{1}{2}$ inch = 1 foot.

From the north-east spit of the western flat, at 150 yards south-westward of the signal-station, the outer edge of the flat curves W. by N. $1\frac{1}{4}$ cables' lengths ; from whence it trends south-westward nearly half a mile, forming the southern and south-eastern side of the river-channel, from the entrance. There is an islet on the south-eastern part of each of these two flats ; that on the eastern flat being merely a small patch of low scrub, lying S. by E. one-third of a mile from the signal-staff. Quandolo islet, on the western flat, at S.W. $4\frac{1}{2}$ cables' lengths from the signal-staff, is considerably larger and more elevated than the other islet. The eastern flat is surrounded with water ; but the south-western end of the western flat is connected with the mud which borders the southern shore.

The NORTHERN SHORE of Moruya river, from the north-western entrance point, curves about S.W. by W. $\frac{1}{2}$ W. 4 cables' lengths to a small sand-spit projecting to the north-eastward, and from thence trends W. $\frac{1}{2}$ S. half a mile to a building near the shore, at Garland town. The land behind this shore is somewhat flat, and covered with open bush of swamp-oak and gum. Close to the eastward of Garland town is a stratum of fine red clay ; and to the westward of the town the land rises to ridges of soft sandstone, covered with gum, oak, and scrub.

From its south-eastern extremity the inner edge of the North spit, opposite the signal-staff, after trending West 150 yards, extends N. by W. $\frac{1}{2}$ W. $1\frac{1}{2}$ cables' lengths, and from thence turns westward towards the northern shore. The shore westward of the small sandy spit just mentioned, is bordered by a mud-flat, the outer edge of which, from this spit, sweeps round in a south-westerly and westerly direction to within a cable's length of the rocky southern shore, at W.S.W. 1 mile from the signal-staff.

The CHANNEL of Moruya river, from its entrance between the signal-staff and the North spit, is bounded to the southward by the edge of the western of the two flats before described, and from thence, by the rocky southern shore, to nearly opposite Garland town. And the channel is bounded to the northward by the inner edge of the North spit, by the northern shore from thence to the small sand-spit, and then by the edge of the mud-flat which trends to the south-westward and westward from the sand-spit.

The channel between the southern edge of the North spit and the flat to the southward of it, is about 100 yards wide, with 7 to 10 feet water in the fairway ; from thence the channel gradually increases north-westward to the width of $1\frac{1}{2}$ cables, with 6 to 9 and 7 feet water in the deepest part, close along the western side of the North spit. From hence the river channel trends south-westward, with an average width of $1\frac{1}{2}$ cables, and 6 and 7 feet water in mid-channel, up to abreast of the small sand-spit, before mentioned, which projects from the northern shore. From thence the

depth of water gradually decreases to 4 feet, the greatest depth being along the edge of the mud-flat on the north-west side, until the north extreme of Quandolo islet bears East, when the deepest water trends south-westward, towards the rocky southern shore; abreast of which there are 7 to 9 feet water. From Garland town Moruya river trends westward $3\frac{1}{2}$ miles, to which distance it takes a winding course from the south-westward.

In 1864, it was proposed that a dike should be constructed on either side of the entrance of Moruya river: that on the south side, a portion of which was then completed, was to extend from the north-east point to the west extreme, and from thence close round the south-west end of Torogy peninsula: and the northern dike was to project from the north-western entrance point E. by N. 3 cables' lengths, in a parallel direction with, and at the distance of 250 yards from the southern dike.

Although Moruya river is only adapted to steamers and other small vessels of light draught, it promises to become a place of considerable importance, it being the only outlet by water, for the produce of the Araluen and Braidwood districts, with their gold-fields. It is confidently anticipated the depth of water in the mouth of the river will be much increased on the completion of the breakwater and other works now in progress.

DIRECTIONS for entering Moruya river can be of little avail on account of the continual changes in its navigation. Vessels entering, must always do so with the flood, more especially when there are freshes in the river; for then the ebb stream runs out through the narrow mouth at the rate of 7 knots, forming eddies that would prevent any vessel from steering, and she would be in great danger of being set on the rocks to the southward, or on the sand-spit to the northward. When bound in, vessels should steer so as to pass near the outer south head, when the *white* leading poles will be seen on the inner south head; these kept in line will lead over the bar in the deepest water. When over the bar, a vessel must be guided by circumstances, as the sand-banks near the entrance of the river change by every tide. At times, if there are no freshes in the river to colour the water, the greatest depth will be apparent, as the bottom consists of white sand or black rocks. Where the water appears most *blue* it is of course the deepest. The best winds for entering Moruya river are those from between North and S.E.; with southerly or south-westerly winds vessels get baffled under the south head. No course can be given for entering; but it is always in a W.S.W. direction. The improvements now in progress will soon alter the entrance of the river. An anchor should be ready to let go in time, after rounding the inner south head.

The TIDES have not been recorded on the Colonial plan of Torogy point and Moruya river; but they probably differ very little from those in.

Bateman bay, at 10 miles farther to the northward. It may therefore be assumed that it is high water on Moruya bar, full and change, at 8h. 45m. ; rise, 4 to 7 feet.

MANEROO RANGE.—Peak Alone, bearing W. $\frac{3}{4}$ S., distant $11\frac{1}{2}$ miles from mount Dromedary, although a solitary mountain, may be considered as the south-easternmost of the Maneroo range, which from a summit at $8\frac{1}{2}$ miles N.W. by N. of this peak extends irregularly, in a N. by E. $\frac{1}{4}$ E. direction 21 miles to Evening peak, at W. $\frac{1}{2}$ N. 14 miles from Torogy point.

The COAST, from the north-west point of the entrance of Moruya river, consists of a sandy beach extending N. $\frac{1}{2}$ E. $2\frac{1}{4}$ miles to a small stream, between which and Broulee head, at N.E. by E. $\frac{3}{4}$ E. $1\frac{3}{4}$ miles from it, are two points, with reefs projecting from them.

BROULEE HEAD is a little peninsula extending three-quarters of a mile eastward from the coast-line, and is enclosed by a reef of dry and covered rocks, close outside which there are 4 fathoms water. This head forms the south-west point of a bay, which from thence extends N.E. $\frac{1}{4}$ N. $2\frac{1}{2}$ miles to Burrewerra point, and is nearly $1\frac{1}{2}$ miles deep. A small vessel may probably find anchorage, in 3 or 4 fathoms, off a little creek in the south-west bight of this bay, protected from south-westerly, or southerly gales by Broulee head ; but the irregular western and northern shores of the bay are bordered by dry and covered reefs

SOUNDINGS.—From 19 fathoms at $1\frac{1}{2}$ miles north-westward of Montagu isle the soundings increase to no bottom in 49 fathoms, at 4 miles E.N.E. of Yellow head. But from 42 fathoms at 4 miles off Marka point the depths decrease, with some regularity, to 30 fathoms at 3 miles south-eastward of Broulee head. At about 10 miles north-eastward of Montagu isle there are 60 fathoms, from whence the soundings decrease to 32 fathoms at 4 miles south-eastward of Broulee head. Between this last depth and 37 fathoms at S.E. 2 miles from Burrewerra point there are 36 fathoms, with regularly decreasing soundings towards the shore ; the bottom being everywhere sand.

BURREWERRA POINT is a rocky headland projecting about half a mile from the coast-line ; it is closely fringed by a reef of dry and covered rocks, and there is a sunken patch close to the north-westward of it. Between this headland and a double rocky point at N. $\frac{3}{4}$ W. $1\frac{1}{2}$ miles from it, are two little bights, separated from each other by a small prominent point, connected by a ledge of dry rocks with a rocky islet lying a quarter of a mile to the eastward of the point. There is a rock above water close to the south-western shore of the southern bight. From the double point a bay, partly bordered by a reef, extends N. $\frac{1}{2}$ W. three-quarters of a mile to South head, which has a rocky reef projecting from it, and forms the southern point of Bateman bay.

BATEMAN BAY extends from the South head N. by E. $\frac{1}{4}$ E. $4\frac{1}{2}$ miles to the North head, and runs in W.N.W. $3\frac{1}{4}$ miles from the Tollgate islets, in the middle of the entrance, to the bar of Clyde river.*

TOLLGATE ISLETS, which are two in number, are connected by a ledge of rocks and reefs, and extend together, $4\frac{1}{2}$ cables' lengths N.E. by N. and S.W. by S.; the south-western, and larger islet is 140 feet high, and both are closely fringed with rocks, having 9 to 6 fathoms water at about $1\frac{1}{2}$ cable's lengths outside them. A small vessel may take shelter under the lee of these islets; but it would be imprudent for a stranger to do so, except in a case of absolute necessity.

There is a channel one mile wide, with 7 to 11 fathoms water, between Tollgate islets and Three Islet reef, which lies S.W. $\frac{1}{2}$ S. three-quarters of a mile from North head.

BLACK ROCK, which lies N. by E. $\frac{1}{2}$ E. one mile from South head, is about 1 cable's length in extent, with 6 to 10 fathoms water close round it. Between this rock and Tollgate islets there is a channel $1\frac{1}{4}$ miles wide, having 10 to 15 fathoms water, on a sandy bottom.

The south-western shore of Bateman bay, from the South head, extends N.N.W. $1\frac{1}{4}$ miles, and from thence N.W. by N. $2\frac{3}{4}$ miles, to Observation head, and consists of a series of rocky points and small sandy bays. From a point at two-thirds of a mile northward of South head, a reef of dry and covered rocks projects one-third of a mile towards Black rock. All the other projections of the south-western shore of the bay are also bordered by reefs of a similar kind, but none of them extend beyond $1\frac{1}{2}$ cables' lengths from the points.

OBSERVATION HEAD, which lies in lat. $35^{\circ} 43' 55''$ S., long. $150^{\circ} 13' 30''$ E., is 50 feet high, and is enclosed by a reef of dry and covered rocks. Snapper islet, at N.N.E. $\frac{1}{2}$ E. one-third of a mile from Observation head, is about 100 yards in extent, and is the north-western and larger of two islets lying W. by N. $\frac{1}{2}$ N. and E. by S. $\frac{1}{2}$ S. nearly 2 cables' lengths from each other. Both islets have reefs about them; the eastern islet having a reef which extends $1\frac{1}{2}$ cables' lengths to the southward. There are two shoal patches between this islet and Observation head, with 2 fathoms water between them and the head. From $1\frac{1}{4}$ miles north-westward of South head to within one mile of Observation head, there are 12 to 8 fathoms at about two-thirds of a mile from the shore; but from 1 mile southward of Observation head to Snapper islet the shore is fronted by a shoal, with $4\frac{1}{2}$ to 2 fathoms water on it.

* See Plan of Bateman bay, No. 2,176; scale, $m = 2$ inches.

NORTH HEAD and NORTHERN SHORE.—North head and Three Islet point, at W. by S. $\frac{1}{2}$ S. two-thirds of a mile from it, are both fringed with dry and covered rocks ; but at the head of the little bay between these points there appears to be a sandy beach. Three Islet point derives its name from three islets lying close together, and extending S.E. by S. a quarter of a mile from the point. Three Islet reef, before noticed, which extends $1\frac{1}{2}$ cables' lengths southward from the outermost islet, has a dry rock on it, with 8 fathoms water close to the westward of it.

REEF POINT is a small projecting headland at W. by N. three quarters of a mile from Three Islet point, with a reef of dry and covered rocks projecting about $1\frac{1}{2}$ cables' lengths from it. The bay between Three Islet and Reef points is divided into two small coves by a point, having a ledge of dry and covered rocks projecting S.S.W. a quarter of a mile from it.

ACHERON REEF which lies S.W. a quarter of a mile from Reef point, is about $1\frac{1}{2}$ cables long, N.W. and S.E., with a rock above water on either end, and a bank, having $1\frac{1}{2}$ to 4 fathoms water on it, extending S. by W. 3 cables' lengths from it. There are 6 and 7 fathoms water between Three Islet point and this bank ; and there is the same depth of water on the west side of the bank, with 6 fathoms at one cable's length westward of the north-western rock on Acheron ledge.

CHAIN BAY extends from Reef point N.W. $\frac{1}{2}$ W. two-thirds of a mile to a point, from which ledges of dry and covered rocks project S.S.W. 2 cables' lengths and $1\frac{1}{2}$ cables' lengths to the south-eastward ; the eastern shore is also bordered by a reef ; but between this and the ledges which project from the north-west point of the bay there is a sandy beach, one-third of a mile long, with $1\frac{1}{2}$ to 2 fathoms within a cable's length of the shore. Immediately behind Chain bay there is some cultivated land, with buildings near it.

WHITE CLIFFS.—SQUARE HEAD.—From the north-western point of Chain bay the northern shore trends W. by N. $\frac{1}{2}$ N. one-third of a mile to the White cliffs, and is bordered with dry and covered rocks, which project one cable's length from the cliffs, and extend along shore double that distance to the westward. From the White cliffs a smooth shore curves a little more than a mile in a W. by S. direction to the inner fall of Square head, a hilly projection 2 cables broad, projecting S. by W. half a mile from the low land behind it, to one mile northward of Observation head.

SOUNDINGS.—From the entrance of Bateman bay to a line between Acheron ledge and Snapper islet there are regular depths, decreasing inwards from 15 fathoms between Black rock and Tollgate islets, and from 11 fathoms between these islets and Three Islet reef, to 6 and 5 fathoms between Acheron ledge and Snapper islet. But the head of the bay is

fronted by a shoal, the 5 fathoms edge of which, from 2 cables' lengths north-westward of Acheron ledge, curves in a W. by S. $\frac{1}{2}$ S. direction to about half a mile southward of Square head, and, after passing at a cable's length outside Snapper islet and the small islet to the south-eastward of it, closes the rocky point at one mile to the south-eastward of Observation head.

DIRECTIONS.—Vessels approaching Bateman bay from the southward, should be careful to give Burrewerra point a good berth, and not haul into the bay until Black rock bears W.S.W., as there are dangerous rollers along the coast from the point to the rock. From about half a mile outside Black rock steer N.W. $\frac{1}{4}$ N. for Square head, keeping in mid-channel between Black rock and Tollgate islets.

From the Northward.—A vessel entering Bateman bay from the northward, should steer about S.W. by S. for Tollgate islets, passing the North head at the distance of about half a mile; and when Square head bears W. by N. $\frac{1}{2}$ N. steer for it on this bearing, which will lead one-third of a mile southward of Three Islet reef and Acheron ledge.

ANCHORAGE.—Tollgate islets afford shelter to large vessels, when blowing from E.S.E. to S.W., in 8 or 9 fathoms, with rocky bottom, close to the islets, and sand and shells at half a mile off. The best anchorage near these islets will be with the south-western islet bearing S.E., distant half a mile, when, if the wind should shift to the North, vessels can get under way and pass between the islets and Black rock. The south-western Tollgate islet should not be approached within a quarter of a mile. But the best anchorage recommended in Bateman bay for large vessels, is in 6 or 7 fathoms, sand, at about half a mile westward of Acheron ledge. Vessels of light draught, may anchor in 3 fathoms close to the north-eastward of Snapper islet. Although the anchorages in Bateman bay appear much exposed to seaward, a vessel with good ground-tackle, may lie here with comparative safety, almost at any time, if her berth be well chosen.

TIDES.—It is high water at Observation head, Bateman bay, full and change, at 8h. 45m.; rise, 4 to 7 feet.

CLYDE RIVER.—The entrance of this river may be considered to lie between Observation and Square heads, where the greatest depth of water in mid-channel, is $4\frac{1}{4}$ fathoms, with decreasing depths towards the heads and towards the bar, at a quarter of a mile within the line of the heads.

The south-western shore of Clyde river from Observation head, curves in a W. by N. $\frac{1}{2}$ N. direction two-thirds of a mile to a projection, from whence a low shore extends nearly N.W. $1\frac{1}{2}$ miles to Smoke point. From the bay between Observation head and the projection next to the westward of it, the southern portion of the bar extends two-thirds of a mile

towards Square head, and has a small sand-bank on it, lying N.W. $\frac{1}{2}$ N. half a mile from Observation head.

From the south-western corner of Square head the northern shore of Clyde river trends North half a mile to a small creek, and from thence W.S.W. $1\frac{1}{4}$ miles to a low point, between which and the south-western shore are the first narrows above the bar, the river being here only $1\frac{1}{2}$ cables wide. At half a mile and three-quarters of a mile westward of the small creek are two points, from the eastern of which a reef projects to the southward. From these points the northern portion of the bar extends in a S.S.E. $\frac{1}{2}$ E. direction to within a short distance of the sand-bank, before mentioned.

THE BAR.—The channel over the bar which extends across the entrance of Clyde river, was in 1864, immediately on the north side of the sand-bank, just mentioned, where there were 7 feet water, enabling steamers and other vessels of light draught, to carry on a considerable trade with Clyde river ; but as the sands are continually shifting, it would be desirable to send a boat to sound on the bar before crossing it.

DIRECTIONS.—A vessel having arrived between Snapper islet and Square head should, in crossing the bar, keep the fairway buoy on the starboard, and three other buoys on the port hand until the mouth of the river be opened. The buoys are painted *black* on their sides and *white* on their ends ; but, as no information has yet been received of the river having been buoyed, farther directions cannot now be given for proceeding above the bar.

Within the bar, at about a quarter of a mile to the north-westward of the sand-bank, there are 9 feet water, from whence the river channel trends along the south-western shore, with the depth of water gradually increasing to the first narrows above the bar, where there are 4 fathoms between Smoke point and the low point to the eastward of it.

Between a small creek on the west side of Smoke point, and an inlet in the opposite shore to the northward, the river is half a mile wide, with an islet near the shore at one-third of a mile to the north-westward of Smoke point. From this part of the river it gradually contracts to the second narrows above the bar, at one mile westward of the islet, where the river is only 2 cables in width. At about three-quarters of a mile westward of Smoke point the southern shore of the river is intersected by two creeks.

From the second narrows above the bar the river again increases in width, and trends N.W. by N. 1 mile to its junction with Macleay river, where the channel is about 2 cables wide. The southern shore between the second narrows and the mouth of Macleay river is intersected by numerous creeks. Macleay river takes its rise from the base of the hills to the south-west-

ward and westward, whilst the Clyde flows southward from the back of Cook's Pigeon House, a remarkable mountain 3,340 feet high, in lat. $35^{\circ} 21' 15''$ S., long. $150^{\circ} 17'$ E., and distant 22 miles from the junction of the two rivers.

ASPECT.—The land on either side of Bateman bay is hilly, with ridges descending to the points of the south-western and northern shores. Farther inland the country is mountainous; mount Oldrey, at W. $\frac{3}{4}$ N. 12 miles from the North head of Bateman bay, being 2,310 feet, and mount Collaribbee, at W.N.W. $5\frac{1}{2}$ miles from mount Oldrey, being 3,385 feet high. From the latter mountain a continuation of the range extends in a S.S.E. $\frac{1}{2}$ E. direction to a hill at W.S.W. 10 miles from the South head of Bateman bay.

FLAT ROCK.—WASP ISLET.—The coast from the North head of Bateman bay extends N. by E. $\frac{1}{4}$ E. $5\frac{1}{2}$ miles to point Upright, and is divided into three nearly equal portions; the first and third being sandy beaches, and the intermediate a series of small points, close off which lie Flat rock and Wasp islet,—the former at $2\frac{1}{2}$ miles northward of North head, and the latter 2 miles southward of point Upright. At one mile to the south-westward of point Upright is the mouth of a narrow inlet, winding $1\frac{1}{2}$ miles south-westward into a lagoon 2 miles long, N. by W. and S. by E., and half a mile wide.

POINT UPRIGHT and GRASSHOPPER ISLET.—Point Upright is the termination of a ridge of hills extending from the westward, and was so named by Captain Cook, from its perpendicular cliffs. Grasshopper islet is situated on a reef which projects above half a mile north-eastward from the point.

DAWSON ISLETS.—Between point Upright and a rocky projection at N. $\frac{1}{2}$ E. 2 miles from it, the coast forms a bay, of which the southern half is a sandy beach, with some sunken rocks along it. From the north point of this bay the coast continues N. $\frac{1}{2}$ E. $1\frac{1}{4}$ miles to a point at the base of a hill which rises close behind, to the height of 1,070 feet. A reef, on which are the two Dawson islets, extends about three-quarters of a mile south-eastward from this point.

O'HARA POINT and ISLET.—The coast between this point and O'Hara point, at N.N.E. $\frac{1}{2}$ E. $2\frac{1}{4}$ miles from Dawson islets, forms a bay nearly one mile deep, with O'Hara islet lying near the shore at $1\frac{1}{2}$ miles northward of Dawson islets. Between O'Hara point and First Sandy point, at N. by E. $\frac{3}{4}$ E. $2\frac{1}{2}$ miles from it, the coast consists of a sandy beach, with rocky points at two-thirds of a mile and one mile westward of O'Hara point. Near a small islet close to the northward of this point there is said to be anchorage for coasters.

BRUSH ISLE, which lies one-third of a mile off First Sandy point, is about a quarter of a mile in extent, and rises to a sand-hill 100 feet high.

STOKES ISLET.—From First Sandy point a beach, having a building on it at one-third of a mile from the point, curves N.N.W. $1\frac{1}{4}$ miles to a projection, from whence the coast extends N.W. by N. $1\frac{3}{4}$ miles, in and out, to the narrow mouth of a creek trending to the westward. The northern side of the mouth of this inlet is formed by a small peninsular headland, between which and a point at N. by E. $1\frac{3}{4}$ miles from it, is a bay having a small opening at one mile north-westward of the head, and forming the mouth of a lagoon about half a mile in extent. Stokes islet, which lies close off this opening, is surrounded by reefs apparently connected with the shore to the northward of the islet.

CRAMPTON ISLET, N.E. by N. $1\frac{1}{4}$ miles from Stokes islet, is situated on a reef which extends across the mouth of a narrow inlet trending North $1\frac{3}{4}$ miles, and separated from the sea by a low narrow tongue of land.

Between Crampton islet and a point at N.E. $\frac{1}{2}$ N. 3 miles from it, is a sandy bay nearly one mile deep, from the north-eastern point of which a rocky coast bordered by a reef, sweeps round in a N.E. and North direction $1\frac{1}{4}$ miles to a narrow opening trending north-westward $1\frac{1}{4}$ miles into a lagoon about 2 miles long, North and South, and half a mile across its widest part, with a small stream flowing into its northern end from the westward. This lagoon is separated from the coast to the southward and eastward of it by ranges of hills. From the mouth of the lagoon a sandy beach, divided into three nearly equal portions by rocky points, extends N.N.E. $\frac{1}{2}$ E. 2 miles to a prominent point, with a reef projecting from it, at W.N.W. about half a mile from which is the entrance of Ulladulla harbour.

ULLADULLA HARBOUR.—The south-east point of the outer entrance of Ulladulla harbour is a rocky projection of the coast, with breakers extending to the northward from it: a detached rocky patch, on which the sea also breaks, lies N.E. a quarter of a mile from the point. This harbour is 4 cables wide, N.W. and S.E., between the rocky shelf which projects 100 yards from the south-east point, and the detached rocks which extend nearly the same distance from the north-west point of the entrance. From the middle of the entrance, Ulladulla harbour trends West half a mile, and is one-third of a mile wide, except at its western end, where a sandy bay forms the Inner harbour, which extends N. by W. $\frac{1}{2}$ W. 2 cables' lengths, and is one cable deep. The north and south shores of all but the Inner harbour are bordered by shelves of rock, extending farthest from the southern shore, from which, at half a mile westward of the south-eastern point of the entrance, the rocky shelf projects 170 yards to the northward.

The outer portion of the harbour has not been sounded ; but at 2 cables' lengths westward of the middle of the outer entrance there are 4 fathoms, from whence to the middle of the entrance of the Inner harbour the depths range between 11 feet and 4 fathoms, with 14 to 6 feet water between 100 yards and 70 yards from the rocky shelves which project from the shores.*

INNER HARBOUR.—The little bay which forms the Inner Ulladulla harbour appears to have originally had no other shelter from the eastward, than that afforded by the westernmost projecting point of the rocky shelf which extends from the southern shore. But in 1864, a pier was in course of construction, to extend from the southern point of the bay and over the western end of the shelf, N. by E. $\frac{1}{2}$ E. 160 yards, and from thence N.W. $\frac{1}{2}$ N. 80 yards, to the pier-head, in 17 feet water.

Between the pier head and the rocky shelf which projects E.S.E. 90 yards from the northern point of the Inner harbour, the entrance is 180 yards wide, with 3 to 5 fathoms water in the fairway, from whence the depths gradually decrease to 5 feet, close to the northern shelf ; but there is deeper water on the south side, there being 10 to 12 feet close along the back of the outer part of the pier. From 17 feet at the pier-head the depth of water gradually decreases to 3 feet within 30 yards of the shore, except on the Ballast in the southern corner of the harbour, towards which a jetty projects from the south end of the pier into 2 feet water.

The most advanced part of the township of Ulladulla appears to be on the south-west side of the Inner harbour, where there is a slip, between which and the jetty, two streams run through the beach ; a small stream also flows into the north-western part of the harbour. There is a weekly steamer communication with Ulladulla, and the harbour is frequented by small coasters.

ASPECT.—The object most remarkable from the sea in the neighbourhood of Ulladulla harbour, is Cook's Pigeon-house, before noticed, which bears W. $\frac{3}{4}$ S., distant 11 miles from the north-western entrance head of Ulladulla harbour. The Pigeon-house, Table hill, between 4 and 7 miles N.N.E. of it, and another mountain, 2,390 feet high, at 4 miles to the northward of the Pigeon-house, form a group which must be very conspicuous to a vessel approaching this part of the coast. From the north extreme of Table hill a ridge descends in an E. by N. direction towards the coast, whilst a lofty range extends W.S.W. 15 miles from the hill to mount Curroebilly, and then turns South 11 miles to Budawang hill, which is 3,610 feet high ; from hence the range trends S.S.W. to within 2 miles of mount Collaribbee, before mentioned.

* Described from the Plan of Ulladulla harbour, executed in 1864, by E. O. Moriarty Esq., Engineer-in-Chief of Harbours and Rivers in New South Wales; scale, $m = 2\frac{1}{2}$ feet.

NURRAWALLA INLET.—Between the north-west entrance point of Ulladulla harbour and a projecting double point at North $1\frac{1}{2}$ miles from it, the coast forms a sandy bay, with reefs projecting from both its points and also from the southern part of the beach. From the north point of this bay a sandy beach curves N.N.W. $1\frac{1}{2}$ miles to Nurrawalla inlet, and from thence N.E. by N. $2\frac{1}{4}$ miles to a low point forming the south-east side of a shallow opening one-third of a mile wide, close in front of which is Green islet. Reefs extend from the south head of Nurrawalla inlet, and also from the foot of a hill at half a mile to the northward of it.

GREEN ISLET and CREEK.—Green islet is fringed by a reef apparently connected with the bar across the mouth of the creek behind it, which trends West 4 miles, and is one-third of a mile wide. At about a mile within the mouth of this creek is a cluster of islets, immediately to the northward of which an arm of the creek branches to the northward.

RED HEAD.—From the north-east point of the mouth of Green Islet creek the coast trends N.E. 2 miles to Red head, which projects two-thirds of a mile eastward from the coast line ; there are two small beaches between the inlet and the point, with hilly land behind. Between Red head and the narrow mouth of Swan lake, at N. $\frac{1}{2}$ E. $2\frac{3}{4}$ miles from it, is a bay one mile deep, the irregular shore of which is intersected by two small streams. Cudmarrah beach, which lies between three-quarters of a mile and $1\frac{1}{2}$ miles south-westward of the mouth of Swan lake, has a reef projecting from the point at each end of it.

SWAN LAKE.—From its mouth, Swan lake continues very narrow for about two-thirds of a mile in a N.W. by N. direction, within which it forms a lagoon extending 2 miles N.W. and S.E., and one mile to half a mile across. From Swan lake a sandy beach trends N.E. $1\frac{1}{2}$ miles to the west point of Wreck bay, which point forms the south side of the narrow mouth of Sussex inlet.

WRECK BAY.—ST. GEORGE HEAD.—Wreck bay is a dangerous bight, which, from its west point, extends E. $\frac{1}{2}$ N. 5 miles to St. George head, and is $2\frac{1}{4}$ miles deep in the eastern part. The northern shore of the bay, from the mouth of Sussex inlet, consists of a sandy beach extending nearly N.E. by E. $\frac{1}{2}$ E. as far as a rocky point at $2\frac{1}{2}$ miles north-westward of St. George head ; but between this point and the head the eastern end of the bay forms a rocky bight bordered with reefs.

SUSSEX INLET and ST. GEORGE BASIN.—Sussex inlet is a narrow channel trending in a N.W. and North direction $1\frac{1}{2}$ miles into St. George basin, which extends from thence 3 miles to the northward, and is 5 miles long from W.S.W. to E.N.E. ; and is separated from Wreck bay by a low

tongue of land, one mile broad, extending 5 miles from the eastward to Sussex inlet. The western shore of the basin forms several large creeks trending to the westward, into the northernmost of which flows a small stream.

ASPECT.—The land from Ulladulla harbour to St. George head is mostly low and thickly wooded, with ridges of hills extending inland from the coast between Red head and Wreck bay. From Table hill the main range takes an irregular semicircular direction to the northward and north-eastward, and, after rounding North and East of St. George basin, terminates at St. George head.

SOUNDINGS.—From 2 miles south-eastward of the South head, to the same distance eastward of the North head of Bateman bay, the soundings range from 32 to 23 and 34 fathoms, and then increase to 51 fathoms at 4 miles eastward of point Upright, between which and 4 miles southward of St. George head the soundings range between 50 and 60 fathoms, with decreasing depths to 30 fathoms at 3 miles E.N.E. of the head.

CAPE ST. GEORGE.—From St. George head the coast trends N.E. by E. 3 miles to cape St. George; there is a small exposed bay midway between these two headlands, and the cape has some sunken rocks close about it.*

LIGHT-HOUSE.—From cape St. George a cliffy coast, with 27 to 29 fathoms at 1 mile from the shore, winds North $3\frac{3}{4}$ miles to Governor head, on the southern side of the entrance of Jervis bay. Midway between the cape and the head is a steep cliffy projection, on which stands the light-house, a *white* tower, 61 feet high, exhibiting at an elevation of 224 feet above the sea, a *white*, *red*, and *green* light, alternating every half-minute. The *white* light is visible at the distance of 18 miles, and the *red* and *green* at 14 miles. When 8 miles distant, on approaching this light from the southward, it must not be brought to bear to the northward of N. by W.: from the northward the light opens of Crocodile head S.S.W. $\frac{1}{2}$ W.

JERVIS BAY.—BOWEN ISLE.—Bowen isle, which forms the southwestern point of the entrance of Jervis bay, lies close off Governor head, from which it is only separated by a breach not much more than a cable's length across, appearing as if the cliff had been torn to pieces, and leaving here and there, a straggling rock above water, forming a kind of break-water, just within which is a small cove fit for boats. The island is half a mile long, North and South, and 2 cables broad, with a hillock on its north end, 140 feet high. There are 14 fathoms water at one cable's length off the north end of the island, and 8 to 5 fathoms within a cable's length of its west side.

* See Plan of Jervis bay, No. 2,176; scale, $\pi = 1.5$ inches.

Bowen isle, which for situation, soil, scenery, and fresh water, seems the most desirable spot in Jervis bay, is moderately wooded, and has much clear ground, covered only with long grass. Its sea front is formed of high vertical rocks, in many places deeply rent. From these cliffs the island slopes gradually but irregularly towards the bay, and that side is low and sandy, intermixed with rocks.

Water.—The largest and most convenient stream of fresh water lies directly at the back of a little sandy bight on the west side of Bowen isle, where boats might easily load in fine weather.

PERPENDICULAR POINT, N.E. $\frac{1}{2}$ E. $1\frac{3}{4}$ miles from the north point of Bowen isle, is a bold cliffy headland 275 feet high, and forms the north-eastern point of the entrance of Jervis bay. This point from its rising perpendicularly to a flat surface, without tree or shrub, is a most conspicuous feature of the coast. But there is an inner northern head to the entrance, formed by Longnose and Dart points, which lie W. by N. $\frac{1}{2}$ N. $1\frac{1}{3}$ and $1\frac{3}{4}$ miles from Perpendicular point. The intermediate shore forms an irregular bight, and a reef projects nearly a quarter of a mile from Longnose and Dart points. With the exception of this reef, the entrance into Jervis bay is free from all dangers, with 25 to 12 fathoms water, on a bottom of sand and mud, and deep water on both sides of the entrance.

Within its entrance Jervis bay extends 7 miles North and South, and nearly 3 to $5\frac{1}{2}$ miles East and West, with very regular soundings, gradually decreasing inwards from 18 and 17 fathoms in the entrance, to 9 and 6 fathoms within half a mile of the greater portion of the shores of the bay; the best anchorage being either in Darling road, to the westward of Bowen isle, or in Montagu road, to the northward of Dart point.

DARLING ROAD is the southern part of a bay 2 miles deep, which from the north extreme of Bowen isle, extends N.W. by W. $\frac{1}{2}$ W. $3\frac{1}{2}$ miles to Plantation point: some sunken rocks lie close to the extremity of the point and near the shore immediately to the southward of it. Two rocky heads project from the shore at S.W. by W. $\frac{3}{4}$ W. $2\frac{1}{4}$ miles, and W. by S. $\frac{1}{2}$ S. $2\frac{1}{2}$ miles from the north extreme of Bowen isle; the north-western of the two heads having some some dry and sunken rocks close off it. A sand-spit, with 2 fathoms water on it, projects half a mile north-westward from the eastern part of the bay, and adds to the security of the anchorage by breaking the swell which sets in; with this exception, the shores of the bay may be approached within a quarter of a mile in 6 and 7 fathoms. The shore from 1 to 2 miles southward of Plantation point is only separated from the eastern end of St. George basin by an isthmus one mile broad. Darling road affords very good shelter from south-east winds, it being quite landlocked, as a vessel may anchor so far in as to have Bowen isle in one with Perpendicular point.

The western bight of Jervis bay, from Plantation point to Flora point, at 3 miles to the northward of it, is $1\frac{1}{2}$ miles deep. At N.W. by W. $1\frac{1}{2}$ miles from Plantation point is a small projection of the shore, from which a ledge of sunken rocks extends one-third of a mile into $2\frac{3}{4}$ fathoms water. There is a small lagoon close behind the beach to the southward of this projection, and at three-quarters of a mile to the northward of it is a small stream of fresh water. There are 4 fathoms water close to the southward of the ledge of sunken rocks, and $2\frac{1}{2}$ fathoms within a cable's length of the beach in front of the lagoon, with $4\frac{1}{2}$ and 5 fathoms at 3 cables' lengths from the shore, to the south-eastward. Flora point and the shore for one mile to the S.W., and a quarter of a mile to the North of it, is bordered by sunken rocks, with 3 to $3\frac{1}{2}$ fathoms water close outside them.

The whole of the west side of the bay is exposed to the heavy swell thrown in by south-east gales, and is consequently unsafe for an anchorage ; the sound of the sea breaking on it may be heard at a considerable distance.

MONTAGU ROAD, which affords the most secure anchorage in Jervis bay, in fact the only secure one for large ships, extends from Dart point N. by W. $\frac{1}{2}$ W. 3 miles to Montagu point, and is $1\frac{1}{2}$ miles deep. At nine-tenths of a mile north-eastward of Dart point is a very small inlet, between which and Calvers dock, nearly two-thirds of a mile farther to the north-eastward, is a little bay, having $4\frac{1}{2}$ and 3 fathoms water at about one cable's length from the shore. There are some sunken rocks about the south-west point of this little bay, and also close along the shore for half a mile north-eastward from Calvers dock, with 5 and 6 fathoms within 2 cables' lengths of the dock ; but the eastern bight of Montagu road is more shallow, there being so little as 7 feet water at a quarter of a mile from the shore. There is water near the beach at half a mile southward of Calvers dock.

The ANCHORAGE in Montagu road is in 9 to 5 fathoms, stiff ground ; but small craft may suit themselves in shore, as the soundings are regular, and there is likewise better shelter between the two points. Although ships of burthen may here lie landlocked, they are still exposed to a heavy fetch of the sea from the southward, but to which, indeed, every other part of the bay is subjected ; it is therefore indispensable that the ground tackle be good.

CALVERS DOCK is a small inlet about the length and breadth of a line-of-battle ship, with 5 feet at low water ; it is a dock already half-formed, and with little labour might be improved into a very convenient one.

HARE BAY.—From a prominent head, with $2\frac{1}{4}$ fathoms water close off it, at a quarter of a mile north-westward of Montagu point, Hare bay extends West $1\frac{3}{4}$ miles to Flora point : it is $1\frac{1}{4}$ miles deep, and is divided

into two bights by a rocky projection, nearly equidistant from Montagu and Flora points. From half a mile south-eastward of Montagu point to the east point of Hare bay the shore is bordered by sunken rocks, which project 2 cables' lengths south-westward from the latter point. Between the extremity of these rocks and $3\frac{3}{4}$ fathoms, at a quarter of a mile off Flora point, there are $4\frac{1}{4}$ to $4\frac{3}{4}$ fathoms water across the bay. The eastern and larger of the two bights into which Hare bay is divided, is mostly occupied by a shoal, with only 1 to 7 feet water on it, extending farthest from its south-eastern shore, between the eastern point of the bay and a winding creek at half a mile to the north-eastward of it. But the western bight—of which the north-eastern end is Plumsell bay—has $4\frac{1}{2}$ to 5 fathoms between 3 and 4 cables' lengths from the shore.

DIRECTIONS.—Vessels bound into, or passing Jarvis bay, ought carefully to avoid being drawn into Wreck bay, to the south-westward, the land being very deceptive. When bound into Darling road, steer for the north point of Bowen isle and round it in not less than 9 fathoms till past the sand-spit, when stand in shore and anchor in 6 to 8 fathoms. Although the island may be closely approached, a vessel, in light winds, should keep without the influence of the swell.

Vessels from the northward and eastward, should give Perpendicular point a good berth, for, although it is bold and clear close to, a fresh south-east wind does not blow home, but becomes light and baffling, while the swell sets heavily upon it; and as there is no anchorage near the point, except at a great depth, it should be carefully avoided in light winds. After passing Perpendicular point the chief danger in the approach to Montagu road is the reef which projects a quarter of a mile from Longnose and Dart points.

TIDES.—It is high water in Jarvis bay, full and change, at 6h. 20m.; rise, 6 to 9 feet.

CROCODILE HEAD.—From Perpendicular point a line of cliffs trends N.N.E. $\frac{3}{4}$ E. $2\frac{3}{4}$ miles to Crocodile head, and from thence N.W. $\frac{3}{4}$ N. three-quarters of a mile to a bight three-quarters of a mile wide, with a small islet and sunken rocks in the middle of it. From the northern point of this bight a continuation of the line of cliffs extends N. by E. $1\frac{1}{2}$ miles to some dry rocks close to the shore, and from thence N.W. by N. 1 mile to Beecroft point, the east extreme of Crookhaven. There are 30 and 32 fathoms water within a mile of the shore between Perpendicular and Beecroft points.*

CROOKHAVEN from Beecroft point, extends West $2\frac{1}{2}$ miles to an isthmus about a quarter of a mile broad, between the sea shore and the

* See Chart, Australia, East Coast, Jarvis bay to Broken bay, No. 2,143; scale, $m = 0.26$ of an inch.

creek before noticed, which winds into Hare bay. Crookhaven is one mile deep, and affords shelter for small vessels from southerly gales.

From the west end of Crookhaven a smooth shore curves in a N.N.W. direction $3\frac{1}{2}$ miles to a low projecting point, between half a mile and 2 miles to the southward of which is a lagoon 2 miles long, North and South, and 1 mile wide, only separated from the sea by a very narrow ridge. From this low projecting point a sandy beach curves N.N.W. $\frac{1}{2}$ W. $2\frac{3}{4}$ miles to a narrow rocky point, forming the eastern head of the entrance of the southern Shoalhaven river.

SHOALHAVEN RIVERS, between which and Sydney there is communication by steamer, three times a week, are separated from each other by Comerong island, the eastern, or sea shore of which trends nearly N.N.W. $\frac{1}{2}$ W. $2\frac{1}{2}$ miles from the mouth of the southern to that of the northern river. The island extends $1\frac{3}{4}$ miles across, and is separated from the main-land by a narrow navigable creek; but the southern portion of the island forms a bight, in, and fronting which are three small Mangrove islands, partly covered at high water.*

BAR.—The approach to the southern Shoalhaven river is over a 6-feet bar, close to the west side of the eastern head, from whence the channel, between the rocky shore on the eastern, and the sandy shoal on the western side, trends S.S.W. $\frac{1}{2}$ W. about half a mile to the entrance of the river, between a rocky point projecting from the southern shore and the Sand head at 150 yards to the westward of it; the channel being here 100 yards wide, with 19 to 21 feet water. From the northern edge of this Sand head a narrow ledge of rocks, above water, extends nearly 2 cables' lengths to the northward, outside of which there are breakers over the sandy shoal on the western side of the channel, from the Bar to the entrance of the river.

GREENWELL POINT.—The south shore of the southern Shoalhaven river, from its entrance, trends in and out, in a W.S.W. direction nearly one mile to Pelican rocks, which are above water, and project about 250 yards north-westward from the shore. From the inner end of these rocks the shore, after trending S.W. by W. one-third of a mile, turns southward and eastward, and forms a rounding point $1\frac{1}{2}$ cables broad, on the opposite shore to which, at 2 cables' lengths to the westward, is the wharf of Greenwell point.

The northern shore of the southern Shoalhaven river from the Sand head, is formed by the south coast of Comerong island, trending W. $\frac{1}{2}$ N. three-quarters of a mile to a mangrove point, between which and Greenwell point, at S.W. $\frac{3}{4}$ S. three-quarters of a mile from it, the river has no other

* Described from a Plan of "Crookhaven" and Shoalhaven rivers, executed in 1864, by E. O. Moriarty Esq., Engineer-in-Chief of Harbours and Rivers in New South Wales; scale, $\frac{1}{2}$ inch = 9.2 inches.

shore to the northward or westward, than the south-east point of the south-easternmost of the three Mangrove islands before mentioned.

The navigable part of the southern Shoalhaven river is confined to a channel, 100 to 150 yards wide, leading through sand and mud-flats, which dry at low tides. For the first quarter of a mile from the entrance, the channel leads close along the northern shore, with 17 to 11 feet water, and is marked on the south side by patches of ballast. The channel next takes a W.S.W. direction nearly three-quarters of a mile to its widest part, between the north-west end of Pelican rocks and the south-east point of the south-easternmost Mangrove isle, and has 13 to $5\frac{1}{2}$ feet water; its northern edge being marked by a small rock at N.E. $\frac{1}{2}$ E. a quarter of a mile from the outer end of Pelican rocks. From these rocks the channel trends S.W. one-third of a mile to its junction with the Navigable creek, which separates Comerong island from the main-land, to the south-westward of it; and from the entrance of this creek the southern Shoalhaven River channel leads S.S.W. $\frac{1}{2}$ W. 2 cables' lengths to the wharf at Greenwell point. There are 6 to 12 feet water in the channel from Pelican rocks to the entrance of the Navigable creek, and 8 to 10 and 6 feet water from thence to the wharf.

From Greenwell point a shoal bight of the southern Shoalhaven river, two-thirds of a mile wide, extends about one mile to the south-eastward; but it is mostly filled with mud-flats, dry at low tides, and surrounding four small islands, the northernmost of which is Goodnight isle. From the west side of this bight the river trends S.W. 2 miles to a point, where it divides into small branches from the westward.

THE NAVIGABLE CREEK, which separates Comerong island from the main-land to the south-westward of it, forms a sort of canal between the two Shoalhaven rivers, navigable for barges or vessels of very light draught. For the first $1\frac{3}{4}$ miles from its entrance the general trend of this Navigable creek is N.W. by W. $\frac{1}{4}$ W. $1\frac{3}{4}$ miles to the south-west point of Comerong island, to which distance it is bounded to the northward by the two southernmost of the three Mangrove isles which lie across the bight in the southern part of Comerong island. And the creek is bounded to the southward by the shore extending north-westward from Greenwell point, by Apple Tree Orchard isle and the main-land to the north-westward of it. The width of the creek from shore to shore, is about 4 cables at its south-east entrance, and 1 cable abreast of the east point of Apple Tree Orchard island, at half a mile from the entrance; from hence to the south-west point of Comerong island, the width between the shores varies from 150 to 200 yards.

The Navigable Creek channel from its south-eastern entrance to the south-west point of Comerong island is only 150 to 50 yards wide, it being contracted by sand and mud-flats, partly dry at low tides. From the entrance, at 2 cables' lengths N.E. by N. of Greenwell point, the channel runs in 4 cables'

lengths to the mouth of the creek which separates Apple Tree Orchard isle from the land to the southward of it. A small creek also branches off to the northward between the two Mangrove isles. From the entrance to these creeks there are 4 to 7 feet water in the channel, and its northern edge, for a distance of $1\frac{1}{2}$ cables' lengths, is marked by patches of ballast.

The Navigable channel from the two creeks which branch southward and northward from it, trends W.N.W. nearly half a mile to a patch of ballast on the north side of Apple Tree Orchard isle, passing close along the north side of the island, with depths of 6 to 11 feet water. At a cable's length to the north-westward of this patch of ballast the channel is divided into two narrow passages. The narrower, but deeper one continues close along Apple Tree Orchard isle 3 miles in a N.W. $\frac{1}{2}$ W. direction, whilst the northern passage trends N.N.W. 2 cables' lengths to a creek which separates the Mangrove isles from the west point of the bight in the south part of Comerong island; from hence the northern passage turns West $1\frac{1}{2}$ cables' lengths to the north-western end of the narrow one.

In the northern passage the depth of water varies from $7\frac{1}{2}$ to $2\frac{1}{2}$ feet; but from dredging operations, there are 6 feet water in the narrow passage close along Apple Tree Orchard isle, to which the Navigable channel is confined by a dyke extending a quarter of a mile, East and West, along the north side of the channel, where the two passages rejoin, at N.W. one third of a mile from the ballast patch, on the north side of the island.

From the north-western end of the southern, or narrow passage the Navigable channel continues close along Apple Tree Orchard isle $1\frac{1}{2}$ cables' lengths in a W. by S. direction, with $6\frac{1}{2}$ to $2\frac{1}{2}$ feet water, to the east side of the north-west end of the creek which separates that island from the main-land. A line of palisades extends from hence W. by N. $\frac{3}{4}$ N. 250 yards, with $2\frac{1}{2}$ to $9\frac{1}{2}$ feet water close along them. From a point of land at the western end of the palisades, where the creek is barely one cable wide between its shores, the Navigable channel curves close along the western shore 4 cables' lengths in a north-westerly and northerly direction, with $7\frac{1}{2}$ to 12 and 7 feet water, to some buildings on the western shore.

The creek from these buildings takes a general N.N.E. direction three-quarters of a mile to its junction with the northern Shoalhaven river, and is 100 to 150 yards wide between its shores; the average width of the Navigable channel being about 70 yards, with 6 to 14 feet water for the first 4 cables' lengths, between which distance and its junction with the northern Shoalhaven river, the depth of water increases to 4 fathoms.

COMERONG ISLAND.—The coast forming the eastern side of Comerong island, after trending in a N.N.W. $\frac{1}{2}$ W. direction $2\frac{1}{2}$ miles from the entrance of the southern Shoalhaven river, terminates at north

point of the island, which forms the south side of the mouth of the northern Shoalhaven river, and may be distinguished by a small hillock on it. On the west side, at a quarter of a mile southward from the point, is the narrow mouth of a lagoon in the northern end of Comerong island, from whence the northern and north-western shores of the island trend West half a mile, and S.W. by S. nearly a mile to the north-western entrance of the Navigable channel, which communicates between the two Shoalhaven rivers. With the exception of the hillock on its north point, Comerong island appears to be low and flat, with its southern shores mostly lined with mangroves, covered at high tides. There is some available forest and bush land on the south-eastern part of the island.

NORTHERN SHOALHAVEN RIVER.—The mouth of this river lies between the north point of Comerong island and the Sand head at a quarter of a mile to the northward of it, and is crossed by a bar, on which the sea breaks. Within its entrance the river expands to more than half a mile in width, but again narrows to 2 cables across, between the north-west extreme of Comerong island and a point of the opposite shore. Between this and another point at one-third of a mile to the south-westward of it, a creek branches off about one mile to the westward, whilst the river trends to the south-westward. Close to the north-westward of the entrance of the Navigable channel, before described, is an islet, from whence the northern Shoalhaven river extends nearly West 5 miles to Pig islet, with a width of nearly a quarter of a mile. Above Pig islet the river winds from a W. by S. direction, along the south side of Cambewarra range.

TIDES.—It is high water in Shoalhaven rivers, full and change, at 8h. 30m. ; rise, 6 to 9 feet.

ASPECT.—Mount Cambewarra, which bears W. by N., distant 9 miles from the entrance of the northern Shoalhaven river, is the most remarkable summit of a range of hills extending from the mount S.W. by W. about 8 miles, and N.E. 4 miles to some table land. But the most elevated land near this part of the coast appears to be the Berry hills, which at 2 miles westward of the entrance of the river, rise from its northern shore to the height of 1,090 feet.

BLACK POINT.—The coast from the entrance of the northern Shoalhaven river forms a sandy beach, extending, with a slight curve, N. by E. $\frac{3}{4}$ E. $5\frac{1}{4}$ miles to a small double creek, from whence the coast trends S.E. by E. $\frac{1}{2}$ E. one mile to Black point, which is enclosed by a reef of rocks. Between Black point and the south point of Geering bay, at N. $\frac{1}{2}$ E. $2\frac{1}{2}$ miles from Black point, are two small bights, separated from each other by a point with a reef projecting from it.

GEERING BAY extends one mile North and South, and is one-third of a mile deep, with a sandy beach, at the northern end of which is a small

double inlet. The southern point of the bay and the beach for some distance to the northward of it, have a reef extending along them.*

From Geering bay a succession of rocky points and small bights extends N. by E. and North 4 miles to the southern head of Kiama harbour. The points which project from the northern, and greater portion of this coast have ledges of sunken rocks projecting from them.

KIAMA HARBOUR is a little cove, available for vessels of light draught, sheltered from the southward and eastward by a peninsula, which together with the rocky shelf about it, extends 4 cables' lengths in an E. by N. direction from the main-land. It is 2 cables broad, and rises at the centre to a hill about 41 feet high, with a flag-staff on it, close to which is "the Blow-hole." There are two detached rocks above water, near the south side, and one close to the north point of the peninsula; the latter lying N. by W. $\frac{3}{4}$ W. 250 yards from the flag-staff. From this rock the entrance of the harbour extends N.W. by W. 3 cables' lengths, and is a quarter of a mile deep.†

From 150 yards northward, to about the same distance north-westward of the rock which forms the eastern point of the entrance, there are 7 to 4 fathoms water, with irregular depths between these soundings and the shore, and 4 fathoms at a cable's length off the south-eastern shore within the entrance; from this the depths decrease somewhat irregularly, up the harbour, in a S.W. $\frac{1}{2}$ S. direction, to 6 feet water at about 150 yards from the shore. At about 150 yards south-westward of the rock which forms the south-eastern point of the entrance, a shoal runs out, in a N.W. direction to 11 feet water. In 1864, works were in course of construction on this shoal to project from the shore N.W. 150 yards into 23 feet water, and W. by S. $\frac{3}{4}$ S. about the same distance into 16 feet water, and forming between their outer ends an open space extending N.N.E. $\frac{3}{4}$ E. and S.S.W. $\frac{3}{4}$ W. 130 yards, and 60 yards deep, having 21 to 10 feet water, with a *black* buoy moored off it, in 16 feet water.

But the most secure part of Kiama harbour is an artificial basin formed between the south-western of these, and other works projecting nearly 100 yards in a N. by W. direction from a jetty at W. $\frac{1}{4}$ S. 2 cables' lengths from the flag-staff; the basin thus formed being 140 yards long, N.E. by E. $\frac{1}{2}$ E. and S.W. by W. $\frac{1}{2}$ W., and 80 yards deep. There is a *red* buoy moored in 14 feet water, off this basin, and there are 14 and 15 feet water across its entrance; from whence the depths gradually decrease

* Wellbank's Nautical Almanac says there is an open roadstead, with moorings, named Geringong, at 12 miles South of Kiama, or in lat. $34^{\circ} 51\frac{1}{2}'$ S.; but as this is the latitude of the northern Shoalhaven river, Geering bay is probably the place meant, with a wrong latitude assigned to it.

† Described from a Plan of Kiama harbour, executed in 1864, by E. O. Moriarty Esq., Engineer-in-Chief of Harbours and Rivers in New South Wales; scale, $m = 5$ feet.

towards the shore, except where a small 1-foot patch lies about 50 yards south-eastward of the north-east side of the entrance. The north-east part of the basin forms a narrow inlet between the works and the shore, with its depth of water decreasing inwards from 13 to 9 feet.

KIAMA TOWN is situated immediately behind a small open bay extending W. by N. $\frac{1}{2}$ N. 300 yards from the jetty; but the shore being mostly rock, with shoal water off it, there appears to be no convenient landing-place immediately in front of the town. Although small, Kiama harbour is of considerable importance in the beautiful Illawarra district. Government moorings are laid down here for steamers, which regularly call in to land and embark passengers and cargo.

The west side of Kiama harbour from this little bay, trends northward a quarter of a mile to the north-western point of the entrance, and consists of perpendicular rock, 40 to 60 feet high, bordered by rocky shelves extending 50 to 150 yards from the shore, and projecting farthest towards the entrance of the basin on the opposite side; the intermediate space being about 120 yards wide, with 10 to 13 feet water.

ASPECT.—The most elevated summit of Flinders range, to the south-westward of Kiama, appears to be mount Nipple, which bears S.W. $\frac{3}{4}$ W., distant 7 miles from Kiama head, and is 2,470 feet high, with one ridge extending W.S.W. from it, and another 10 miles north-westward to the south-western termination of Reliance range. The Fall and Mount are two other heights between Flinders range and the coast, the former at N.N.E. $2\frac{1}{2}$ miles, and the latter N.E. by E. 3 miles, from mount Nipple. From the north-western trend of Flinders range ridges descend north-eastward towards the coast.

BASS POINT.—The coast from Kiama harbour extends irregularly, N. by E. three-quarters of a mile to a projecting head, and from thence N.N.W. $1\frac{1}{4}$ miles to a creek, close off which is an islet surrounded by a reef, having 16 fathoms water close to the south-eastward of it. Reefs also extend from the head into the bay to the north-westward. From this creek two small sandy bays extend $1\frac{1}{4}$ miles in a N.E. by N. direction, from whence a line of cliffs trends north-eastward $1\frac{1}{2}$ miles to Bass point, which has sunken rocks projecting from it.

WINDANG ISLET.—Between Bass point and Red point, which bears North, distant 6 miles from it, the low coast forms an exposed bay nearly 2 miles deep, the sandy beaches, of which its shore consists, being separated by three rocky points, between W.N.W. and N.W. from Bass point. At North one mile from the northernmost of these points lies Windang islet, close to the beach.

ILLAWARRA LAKE.—The beach immediately behind Windang islet forms the only barrier between the sea and the south-east corner of Illawarra

lake, which from $5\frac{1}{2}$ miles W. by N. of Bass point, extends N.N.E. about 5 miles to nearly 3 miles westward of Red point, and is 3 miles wide. A small stream flows into the south-west corner of the lake, and its north-western shore is intersected by numerous creeks.

RED POINT, so named by Captain Cook from the dull red colour of the cliffs and rocks of which it is composed, lies in lat. $34^{\circ} 29' 30''$ S., long. $150^{\circ} 57'$ E., and, according to Captain Flinders, has four hillocks on it, which present the form of a saddle. Red point may also be readily known by a remarkable hill, at about W. by N. 6 miles from it, which, from its form, was named Hat hill by Captain Cook. From the back of this hill Reliance range trends S.W. $\frac{1}{2}$ S. 12 miles and N.N.E. 10 miles, descending in the latter direction behind mount Kiera to the coast.

RED POINT ISLETS and TOM THUMB ISLETS.—The former are three low rocky islets extending, nearly in line, one mile eastward from Red point; and Tom Thumb islets, which are two in number, and also rocky, lie respectively N. by E. $\frac{3}{4}$ E. $1\frac{3}{4}$ miles, and N. $\frac{1}{4}$ W. 2 miles from Red point. It has been said that a shoal exists in the vicinity of these islets; but this requires confirmation.

TOM THUMB LAKE.—From Red point, cliffs trend N.W. by N. one mile to the southern point of a sandy bay, which from thence extends N. by W. $\frac{1}{4}$ W. $3\frac{1}{4}$ miles to Wollongong head, its southern part being three-quarters of a mile deep. At W. $\frac{1}{2}$ S. $1\frac{1}{2}$ miles, from the north-western Tom Thumb islet, the beach which forms this bay, is intersected by the narrow shallow mouth of Tom Thumb lake, which is $1\frac{3}{4}$ miles long, North and South, one mile wide, and is separated from the sea-shore by a narrow tongue of land, extending $1\frac{1}{2}$ miles from the northward to the mouth of the lake.

SOUNDINGS.—From 31 fathoms at 1 mile off Beecroft point the depth of water decreases to 10 fathoms at $2\frac{1}{2}$ miles N.E. of the point, from whence the soundings increase with some regularity, to 42 fathoms at 5 miles off Black point, between which and $2\frac{1}{2}$ miles off Bass point, the soundings range from 30 to 44 fathoms, and then again decrease to 23 fathoms at $2\frac{1}{2}$ miles south-eastward of Red point. The 100-fathoms edge of the bank of soundings, from $1\frac{1}{4}$ miles eastward of Black point, extends northward to about the same distance off Wollongong head; and at about 20 miles eastward of Kiama head there are 280 fathoms, fine dark sand.

WOLLONGONG HEAD is a rocky peninsula projecting East 2 cables' lengths from the lower land to the south-westward of it; it extends $1\frac{3}{4}$ cables' lengths across from its south side to its north point, and rises to a hill, on which is a signal station, at S. by E. $\frac{1}{4}$ E. one cable's length from the north point. Some rocks project from the east point of the peninsula,

and a blue sandstone flat projects 40 to 60 yards from the rocky shelf to to the westward of the north point.*

WOLLONGONG HARBOUR, between which and Sydney there has for many years, been a constant communication by steamers, is the southern bight of a bay extending N.W. $\frac{1}{4}$ N. nearly two-thirds of a mile to a ledge of rock which borders the sandy shore for about 2 cables' lengths farther to the northward, and has detached rocks projecting from it about 120 yards to the south-eastward. From 5 fathoms at $1\frac{1}{2}$ cables' lengths W.N.W. of the north point of Wollongong peninsula the depth of water decreases regularly, to $2\frac{3}{4}$ fathoms within 150 yards of the detached rocks which project from the north-west point of the bay.

PARA REEF.—The only detached danger in Wollongong bay is said to be Para reef, lying nearly E.S.E. 2 cable's lengths from the north-west point of the bay; there are 12 feet water on it, but when there is any easterly swell the sea breaks on this reef.

EASTERN PIER and JETTY.—Until recently the only additions to the natural formation of Wollongong harbour were the old breakwater and jetty, the outer end of the former of which bears W. by S., distant nearly one cable's length from the north point; and the latter projects north-westward from the shore at nearly one cable's length to the south-westward of the northern end of the old breakwater. But in 1864, a pier was in course of construction, projecting from the north end of the old breakwater N.W. by W. 120 yards, into 17 feet water, with the Eastern pier from thence extending West 40 yards, into 23 feet water.

Close outside the Eastern pier there are 13 to 24 feet, and 18 to 10 feet water inside it, from the pier-head to the shore. From the Eastern pier-head to the outer end of the jetty, at 170 yards to the southward of it, there are 18 to $7\frac{1}{2}$ feet, with the water deepening outwards, and gradually shoaling inwards. The water for about 50 yards off the jetty, from N.W. to S.W. of it, is 20 to 9 feet deep. From the south-west corner of the jetty its south-western side trends S.E. by E. 80 yards to the north-west side of the entrance of the inner basin.

JETTY LIGHT.—PILOT.—A *red* light, which may be seen at the distance of 3 or 4 miles, is shown on the jetty head, only in answer to a signal from the offing, and denotes a pilot ready to give assistance. On approaching the basin this light should be kept well open on the port hand, to avoid the pier or breakwater now in course of construction.

* Described from a Plan of Wollongong, executed in 1864, by E. O. Moriarty Esq., Engineer-in-chief of Harbours and Rivers in New South Wales; scale $\left\{ \begin{smallmatrix} m=1 \\ m=10 \end{smallmatrix} \right\}$ feet.

The OUTER BASIN, or space between the jetty and the southern shore of the harbour, is 80 to 50 yards wide, and extends about 100 yards E.S.E. and W.N.W., with 10 to 7 feet water, and a shoal patch near the southern shore. But it was determined that this space should be deepened to 13 and 12 feet below the low-water level.

The INNER BASIN, which communicates with the north-east corner of the outer one, is 100 yards long N.E. and S.W., and 45 yards wide, with a bridge across its entrance leading to the jetty. This basin, which appears to be chiefly formed by excavation, was nearly completed in 1864.

WOLLONGONG.—From 100 yards S. by E. to 150 yards S.S.W. of the outer corner of the jetty, the southern shore of the harbour has a ledge of rock projecting 20 to 40 yards from it, between which and a similar ledge at nearly one cable's length to the north-westward of it, is a beach with a creek behind its north-western end. The shore between the inner basin and this creek forms the water frontage of Wollongong, the chief town of the Illawarra district.

From the creek the shore for nearly one-third of a mile, in a N.N.W. $\frac{1}{2}$ W. direction, has ledges of rock projecting 100 to 120 yards from it; but the remaining portion of the western shore of Wollongong bay has a straight beach, backed by sand-hills, covered with coarse grass.

DIRECTIONS.—A vessel from the southward bound to Wollongong, should, after passing outside Tom Thumb islets, steer N.W. by N., and then round Wollongong head; when off the signal station, haul up to within a cable's length of the rocks, and work up for the jetty head, taking care to avoid Para reef, which lies nearly half a mile to the northward of it.

From the Northward.—Vessels running along shore from the northward for Wollongong, should not, when within 4 miles of it, bring Wollongong head to bear to the southward of S.S.W. until Hat hill is well opened to the southward of mount Keira, when they will be to the southward of Bellambi reef, and may then steer south-westward for the harbour, keeping a good look-out for Para reef. There is a large mooring buoy in mid-channel for vessels to hang on by when they cannot work up.

TIDES.—It is high water in Wollongong harbour, full and change, at 8h. 30m.; rise, 4 to $5\frac{1}{2}$ feet.

TOWRADGI POINT.—From 2 cables' lengths northward of the north-west point of Wollongong bay a sandy beach extends, with a slight curve, N. by E. $\frac{1}{2}$ E. $1\frac{1}{2}$ miles to Towradgi point, which is formed of blue-stone boulders, with a covered reef extending from it. From Para creek, behind the ledge of rock at the southern end of this beach, a coast range

of low sand hills extends close behind the beach to Towradgi point; these hills are covered with coarse grass and scrub, with dense bush behind them.

SANDSPIT POINT.—Between Towradgi point and Sandspit point, at N.N.E. $\frac{1}{4}$ E. three-quarters of a mile from it, is a sandy bay, with ranges of low sand-hills close along the beach, separated by two creeks, the mouths of which are barred across by the beach. Sandspit point, which has some rocks close to its extremity, is enclosed by a reef, that is always covered.

BELLAMBI POINT and GREAT REEF.—From Sandspit point a sandy beach, apparently bordered by a shoal, winds in and out, half a mile in a N.N.E. direction to Bellambi point, which consists of rock with a surface of sand. Bellambi great reef, which always shows broken water, extends nearly E. by S. half a mile from the east side of Bellambi point, and has a rock about one cable's length in extent, lying S.E. by E. 4 cables' lengths from the point. There are 3 fathoms at a cable's length to the south-eastward, and 11 feet water at 50 yards to the north-westward of the rock, with a boat channel nearly midway between it and the shore.

BELLAMBI BAY extends from Bellambi point N.N.W. $\frac{1}{2}$ W. $1\frac{1}{4}$ miles to a point with a ledge of rock projecting about a cable's length from it, and is one-third of a mile deep. The southern shore consists, like Bellambi point, of rock with a sandy surface, extending from the point half a mile in a W. by N. direction to a small creek close behind it. From hence to the north-west point of the bay, its western shore consists of a smooth sandy beach.

BELLAMBI VILLAGE.—From 150 yards northward to one-third of a mile north-westward of Bellambi point there are 3 to 6 fathoms water, from which soundings the depths decrease somewhat irregularly, to 2 fathoms within 100 yards of the shore, in a little bight extending a quarter of a mile westward from Bellambi point, and forming the sea frontage of Bellambi village. In the eastern corner of this bight is a jetty 500 feet long. Moorings have been laid down off the jetty, consisting of $1\frac{3}{4}$ inch mooring-chain, with anchors of 2 tons weight each, lying S.E. and N.W. from each other, in 5 to 6 fathoms water: mooring-bridles with *red* buoys are attached; and vessels may swing to any of the moorings in 3 to 6 fathoms water.

DIRECTIONS.—From a vessel bound to Bellambi bay from the southward, will be seen to the northward of the northernmost Hat peak a broken point in the mountain range, named Coorimal or Broken Nose, which being brought to bear W.S.W. will lead into the bay clear of the reefs.

From the Northward.—Vessels from the northward proceeding to Bellambi bay, from 4 miles off Hacking head, in lat. $34^{\circ}4'45''$ S., long. $151^{\circ}11'$ E.,

should steer S.W. by S. until a white sandy point forming the east extreme of the bay, is seen ahead. While steering for this point, an iron-roofed store will show the jetty, which being got to bear S.S.W., and steered for on that bearing, will lead to the moorings.

Embarking Coal.—Vessels drawing 10 feet, or according to the tide, more water, can take in their cargoes under the coal “*straith*” from the railway trucks at the end of the jetty. A tramway 3 miles long, leads to the mines, where a clear dry superior steam coal is worked in a seam 9 feet thick.

WANIORA POINT.—From the north-western point of Bellambi bay the coast extends North one mile to Waniora point, which has a reef projecting from it, and separates a small bight to the southward, from a sandy bay extending N.N.W. $\frac{1}{4}$ W. 1 mile from the point.

COAL CLIFF.—STANFIELD BAY.—From the northern point of the sandy bay just noticed, the coast extends N. by E. $\frac{1}{2}$ E. $4\frac{1}{4}$ miles in a direct line to Coal cliff: for the first 2 miles the coast appears to be low and bordered by reefs, but the remaining portion consists of a line of cliffs. Stanfield bay is merely the northern of two small bights lying between Coal cliff and a little stream at N. by E. $\frac{1}{2}$ E. $1\frac{1}{2}$ miles from it.

BOAT HARBOUR.—The coast from Stanfield bay extends, with a little indentation, N.E. $\frac{1}{2}$ N. $7\frac{1}{2}$ miles to a Boat harbour, where water may be procured, with shelter for large boats, from all winds except those from the southward and eastward. This coast consists of a line of cliffs, except where it is broken for about $1\frac{1}{4}$ miles, by two little beaches midway between Stanfield bay and the Boat harbour.

WATA MOOLI, N. $\frac{3}{4}$ E. one mile from the north-east head of the Boat harbour, is a cliffy head closely fringed by dry and covered rocks, with a small indentation to the southward, and a double bay extending from it N.N.E. $\frac{1}{4}$ E. $1\frac{1}{4}$ miles: the north point of this bay and the projection which divides it into two sandy bights, are bordered with dry and covered rocks.

HACKING HEAD.—From this double bay a line of low cliffs trends irregularly, in and out, $2\frac{3}{4}$ miles in a N. by E. $\frac{1}{2}$ E. direction to Hacking head, and is mostly fringed with dry and covered rocks, not extending far from the shore, except at about half a mile to the south-eastward of Hacking point, where there is a detached patch of rocks 2 or 3 cables’ lengths in extent, with 16 fathoms water at half a mile to the eastward, and 9 fathoms close to the northward of it.*

ASPECT.—Ranges of hills extend close along the coast from Bellambi bay to Hacking head; but none of them appear to be very elevated or

* See Plans of Botany bay and Port Hacking, No. 2,179; scale, $m = 2$ inches.

remarkable; that most worthy of notice being Table hillock, 484 feet high, at S.S.W. $1\frac{3}{4}$ miles from Hacking head.

SOUNDINGS.—From about 13 miles off Red point the 100-fathoms edge of the bank of soundings extends nearly N.N.E. to about the same distance off Hacking head, with 65 to 40 fathoms between 11 and 5 miles from the shore. But there are 53 fathoms, mud, at 3 miles off the Boat harbour, and 24 to 16 fathoms at 1 mile from the shore from Wata Mooli to Hacking head, the bottom being mostly sandy.

PORT HACKING is a small anchorage, suitable for coasters, on the west side of Hacking head, which protects the port from southerly or from south-easterly gales. The entrance, which lies between Hacking head and Glaisher point, at nearly two-thirds of a mile to the westward of it, is half a mile wide, with 4 to 5 fathoms water between the ledges of rocks which project from both points of the entrance. From Hacking head the port extends nearly one mile in a W. by S. $\frac{1}{2}$ S. direction to a bar with 6 to 9 feet water on it, stretching across an opening between two rocky points, lying N. by E. and S. by W. one-third of a mile from each other, and forming an inner entrance, leading from Port Hacking into the shallow, but extensive inlet to the westward.

Port Hacking is nearly half a mile wide, with two small sandy bights on the south side, divided by a rocky projection, close to which there are $2\frac{1}{2}$ fathoms water. The northern shore, which extends W. by S. $\frac{1}{2}$ S. barely half a mile from Glaisher point to the northern point of the inner entrance, forms the south end of a hilly promontory, a quarter of a mile to half a mile broad, extending $1\frac{1}{4}$ miles from the northward. There are 11 to 6 fathoms from one mile north-eastward, to the entrance of Port Hacking; but from 5 fathoms in the entrance, the depth of water decreases to 2 fathoms at about 2 cables' lengths from the north and south shores.

PORT HACKING INLET.—From the inner entrance of Port Hacking the southern shore of the inlet trends in and out, 2 miles to the westward, and is bordered by a bank extending 2 to 4 cables' lengths from the shore. At three-quarters of a mile to the westward of the southern point of the inner entrance is a rocky head, from which a shoal ridge projects N.N.W. one-third of a mile, with an islet on its outer end, and a smaller one on the west side of the ridge, close to the head.

A BOAT CHANNEL winds westward along the northern edge of the bank just noticed, but is only defined on the north side by the southern end of a hilly tongue of land extending, between two creeks, above one mile from the northward; and by the shore from a quarter of a mile northward to one mile westward of the northern islet. The channel is barely one cable wide between the east end of the southern bank and the rocky south-east point of the hilly tongue of land to the north-westward of it, and 120

yards wide between the south-western point of the tongue of land and the northern islet, to the south-westward of it. For about one mile to the westward of the islet the channel is $1\frac{1}{2}$ to 2 cables wide, when the inlet forms two arms, one trending between the hills to the south-westward, and the other branching between other hills to the north-westward, in which direction a small river winds into the inlet from the south-westward.

TIDES.—It is high water in Port Hacking, full and change, at 8h.; springs rise 7 to 8 feet.

BATE BAY, an exposed bight, $1\frac{1}{4}$ miles deep, between Port Hacking and Botany bay, to the north-eastward, extends from Glaisher point N.E. $3\frac{1}{4}$ miles to Potter point, close to the north-westward of which is Sugar-loaf hillock, with some dry and covered rocks projecting from its base to the southward. At half a mile westward from Potter point is another rocky projection, from which a reef extends half a mile to the south-westward. The western shore of Bate bay trends in and out, nearly one mile northward to a point closely fringed by a reef, on the north-west side of which is a small sandy bight; this reef, which has 6 and 7 fathoms water close outside it, continues along shore for about one-third of a mile southward from the point. From this little bight the shore curves along the foot of bare sandy ridges to the rocky projection at half a mile westward of Potter point. There are 10 fathoms in the middle of the entrance of the bay, between which and 9 fathoms water at a quarter of a mile off shore abreast of it, there are irregular depths of 7 to 11 fathoms, with $2\frac{1}{4}$ fathoms at W.S.W. one mile from Potter point.

CAPE SOLANDER.—From Potter point a cliffy coast, closely fringed with rocks, trends N.E. by E. half a mile to cape Baily, from whence a more elevated line of cliffs extends 2 miles northward to cape Solander, the south-west point of the entrance of Botany bay. A sand-hill rising from a bluff at half a mile northward of cape Baily, appears to be the only hill worthy of notice over the cliffs between capes Baily and Solander.

BOTANY BAY.—The outer heads of Botany bay are cape Solander and cape Banks, at N.E. $\frac{1}{2}$ E. $1\frac{1}{4}$ miles from it, the latter being a small peninsula projecting a little more than a cable's length from the cliffy land to the northward of it. There are 4 fathoms water close to cape Solander, and 7 fathoms at one cable's length from cape Banks, with 10 to 17 fathoms between them. From cape Solander the south-western side of the entrance is a continuation of cliff trending N.W. three-quarters of a mile to Inscription point, and is bordered by a rocky ledge, not extending beyond one cable's length from the shore; this point and the shore for about one-third of a mile to the south-westward of it are fringed by a narrow reef.

The north-eastern side of the entrance of Botany bay trends in and out, three-quarters of a mile westward to a point, between which and the north-eastern inner head of the entrance there is a shallow bight. The north-eastern inner head, which lies N.N.E. three-quarters of a mile from Inscription point, has a tower on it, close to the west side of which a monument was erected to the memory of the unfortunate French navigator, M. La Perouse. A small islet extends $1\frac{1}{2}$ cables' lengths from the south point of this head, with which it is connected by narrow fringing reefs. At $1\frac{1}{2}$ cables' lengths to the southward of the islet is a rocky patch, between which and the south-eastern side of the entrance there is a channel nearly half a mile wide, with regular soundings in 8 to 10 fathoms, and a clear approach from seaward.

Within its entrance, Botany bay forms nearly an equilateral triangle, of which each side is about 4 miles long ; the shores are low and wooded, with very shoal water extending a considerable distance from them, except for about one mile within the north-eastern inner head of the entrance, where some low hilly ranges terminate in two points, one at 4 cables' lengths, and the other at one mile N.W. by N. from the Monument, each point being closely fringed by a reef, with $3\frac{1}{4}$ fathoms close outside the former, and $2\frac{1}{2}$ fathoms at one cable's length off the latter point. Between the Monument and the north-western point there are two shallow sandy coves.

The southern shore of Botany bay from Inscription point, sweeps round half a mile in a S.W. direction, from whence a sandy beach extends W. by S. $1\frac{1}{2}$ miles to a low point, between half a mile and $1\frac{1}{4}$ miles to the westward of which, the southern shore of the bay is formed by the northern end of a low flat peninsula extending from the southward, and separating a shallow lagoon on its east side, from the estuary of George river on its west side. The lagoon within its entrance, extends nearly 2 miles East and West, and one mile South from its entrance.

GEORGE RIVER.—The estuary of this river is one mile wide, between the west point of the peninsula and a low broad point to the westward of it, from whence a bight, one mile wide, extends 2 miles to the southward : a point projecting from the eastern side of the peninsula, gives the southern part of this bight the form of a lagoon, about the same size as that to the eastward of it. At W. by S. $1\frac{1}{2}$ miles from the west point of the peninsula, the estuary of George river is about a quarter of a mile wide, from whence its main course, between the numerous creeks on either side of it, trends W. by N. 3 miles to the junction of George river, with a narrow creek, or rivulet from the southward : to this junction the river flows from the northward and westward.

COOKS RIVER.—From the west side of the estuary of George river the low sandy shore which forms the west side of Botany bay, curves

N. by E. $\frac{3}{4}$ E. 4 miles to Cooks river, a considerable stream flowing from the north-westward, and which supplies the city of Sydney with fresh water.

From the mouth of Cooks river, which is about 3 or 4 cables wide, the north-eastern shore of Botany bay trends S.E. by E. $\frac{3}{4}$ E. $1\frac{1}{2}$ miles to the foot of a hillock, between which and the first point to the south-eastward of it is a shoal sandy bay, one mile across N.W. and S.E. and nearly half a mile deep. At half a mile westward of the hillock is a small jetty, close behind which is an hotel.

Botany bay is generally so shallow, that the only part having more than $3\frac{3}{4}$ fathoms water, is confined to the eastern side of the bay, between the entrance and three-quarters of a mile S.S.E. of the jetty, and is therefore quite open to the south-eastward. This space of comparatively deep water, is one mile wide, close within the entrance, from whence it gradually narrows to the north-westward. There are 7 to 9 fathoms across the entrance, between Inscription point and the Monument, from whence the depth of water decreases very gradually, to 4 fathoms at three-quarters of a mile from the jetty.

At one cable's length to the north-westward of Inscription point there are $5\frac{1}{2}$ fathoms, from whence the 3-fathoms edge of the shoal water which occupies the greater portion of the bay, trends half a mile to the westward, and, after winding $2\frac{1}{2}$ miles in a N.W. direction, turns north-eastward to about 4 cables' lengths off the jetty. From this 3-fathoms edge the water gradually shoals towards the southern and western shores and Cooks river; the most shallow part being apparently off the low peninsula and the lagoon to the eastward of it, on the south side of the bay, where there are only 6 feet water at above three-quarters of a mile from the shore. From 4 cables' lengths off the jetty the 3-fathoms edge of the shoal water which projects from the north-eastern shore of the bay, trends in a S.E. by E. $\frac{1}{2}$ E. direction to the first point to the northward of the Monument, with very shallow water towards the shore.

DIRECTIONS.—To sail into Botany bay, keep in about mid-channel between the outer heads, and by not quite shutting in cape Banks behind the next point to the westward of it, the rocky patch at 4 cables' lengths southward of the north-eastern inner head will be avoided. Having passed this danger, haul in towards the north-eastern shore, and anchor in 6 or 5 fathoms, with the Monument bearing about E.S.E. A vessel seeking shelter in Botany bay from a southerly gale, will probably find as good, if not better, anchorage, in 5 or 4 fathoms, at 3 or 4 cables' lengths to the north-westward of Inscription point. But, though the anchorage in the eastern part of Botany bay is of considerable extent where vessels may lie in 7 to 4 fathoms water, there is no shelter from

south-easterly winds, and when they blow from that quarter, a heavy sea rolls into the bay.

TIDES.—It is high water in Botany bay, full and change, at 8h. 15m.; rise at springs, 7 to 8 feet.

LONG BAY.—From cape Banks a line of cliffs extends in a N. $\frac{1}{2}$ W. direction $1\frac{3}{4}$ miles to the south-west point of Long bay, which is half a mile wide at its entrance, from whence it runs in two-thirds of a mile, and terminates to the northward in a narrow cove. Some sunken rocks project from the north-east head of the bay.

COOGEE BAYS.—From the projecting north-east head of Long bay cliffs trend N.N.W. two-thirds of a mile to the south point of a bight two-thirds of a mile wide, from S. $\frac{3}{4}$ W. to N. $\frac{3}{4}$ E., and nearly half a mile deep. Between the cliffy headland which forms the northern point of this bight, and a projecting point at $1\frac{1}{2}$ miles to the northward of it, is a bay half a mile deep in its northern part, where there are two very small inlets, the south-western of which has some sunken rocks close off it.

BONDI BAY.—From the northernmost point of Coogee bays—which projects nearly two-thirds of a mile south-eastward from the coast-line, and has some rocks close to the shore at half a mile northward of it—a double bight extends N. by E. $\frac{1}{4}$ E. $1\frac{3}{4}$ miles to Eclipse bluff. A point at half a mile south-westward of the bluff, separates Grama Grama bay, on its south-west side, from Bondi bay N.E. of it. From Eclipse bluff a line of coarse sandstone cliffs extends, with a slight curve, N. $\frac{1}{2}$ W. $2\frac{1}{4}$ miles to the Outer South head of Port Jackson.

SOUNDINGS.—At nearly E. by S. 14 miles from Hacking head there are soundings in 90 fathoms, dark sand, from close outside of which the 100-fathoms edge of the bank of soundings extends North and north-eastward to 100 fathoms at E. by N. 19 miles from the Outer South head of Port Jackson. From this 100-fathoms edge of the bank the soundings decrease with regularity, towards the shore, which, from 4 miles southward of Hacking head to the entrance of Port Jackson, may be generally approached to the distance of about a mile, in 20 to 30 fathoms, the bottom being everywhere sand. There are no detached dangers off this part of the coast, except the small patch of rock at half a mile eastward of Hacking head; and the ledges of rocks which project from most of the points, rarely extend beyond a quarter of a mile from them.

PORT JACKSON, independently of being the port of the metropolis of New South Wales, is justly extolled as the most commodious and secure harbour on the east coast of Australia; and although vessels have sometimes been wrecked in attempting to enter, these disasters, in most cases,

may be attributed rather to want of judgment and common prudence than to any real difficulty in making or entering the port.*

In approaching Port Jackson from the eastward, the summit of the northern of the two Sydney heads will, in clear weather, be first seen, from its being considerably higher than the adjacent coast. As the port is neared, it will be easily identified by the light-house and signal station on the Outer South head and the bold, perpendicular profile of the North head.

The characteristic features of the coast to the northward and southward of Port Jackson, assume somewhat different aspects: for, although the North head, with its immediate vicinity, presents a high, table-topped precipitous appearance, yet the high undulating hills, thickly covered with trees, which rise from the coast farther to the northward, are strikingly in contrast with the sterile table-topped cliffs which extend to the southward of the port; and would, even if the light-houses did not present a conspicuous feature, point out whether the land seen, is to the northward or southward of the entrance of Port Jackson.

OUTER SOUTH HEAD.—SIGNAL STATION.—Outer South head is a precipitous projection of the coast, which here consists of coarse sandstone cliffs, of a light reddish colour: the summit of the head is 300 feet above the sea. On the outer edge of the cliff, at about a quarter of a mile to the northward of the Outer South head light-house, are a signal station and an electric telegraph office, communicating with Sydney. Marryat's signals are at present used, and the new mercantile code is also about to be adopted for communicating with vessels. The pilots' look-out is kept at the signal tower, from whence vessels' night signals for pilots will be answered by blue-lights.

LIGHT.—The Outer South head light-house is a *white* circular stone building, 76 feet high, standing near the edge of the cliff, at a quarter of a mile to the southward of the signal station, and in lat. $33^{\circ} 51' 30''$ S., long. $151^{\circ} 18' 15''$ E. It exhibits a *white* light, *revolving* every $1\frac{1}{2}$ minutes, placed at an elevation of 344 feet above the level of high water, and from an elevation of 18 feet, is visible in clear weather, at the distance of 25 miles from seaward, between the bearings of N. by W. and S. by W. $\frac{1}{2}$ W.

From the Outer South head the cliffy coast-line trends N.N.W. $\frac{1}{2}$ W. one mile to Inner South head, which forms the rounding point on the southern side of the entrance of Port Jackson.

The GAP.—Midway between the Outer and Inner South head light-houses the profile of the cliffs breaks down to a deep hollow and

* See Plan of Port Jackson, No. 1,069; scale, $m = 3\cdot5$ inches.

indentation of the coast, known as the Gap, which is so remarkable, that it has in a dark night, even been mistaken for the entrance of Port Jackson. Gap bluff, a projection immediately to the northward of the Gap, rises to the height of 300 feet.

INNER SOUTH HEAD.—From Gap bluff the ridge gradually descends to the Inner South head, which is 60 feet above high water, and has a light-house recently erected upon its extremity.

LIGHT.—The Inner South head light-house, which is intended for actual guidance into the harbour, after the more lofty Outer South head light has shown proximity, is a tower 30 feet high, painted *red* and *white* in vertical stripes, and built upon the edge of the cliff of the Inner South head; it shows a *fixed white* light, at the height of 90 feet above high water, and, from an elevation of 18 feet, is visible in clear weather, at the distance of 15 miles from the eastward, between the bearings of N.W. by N. and S.W. $\frac{1}{4}$ W. The light suddenly opens out from Gap bluff upon the former bearing, if coming from the southward, when abreast of, and $5\frac{1}{2}$ miles off Botany bay heads; or upon the latter bearing, if coming from the northward, the light will open out from the Outer North head a little before the floating light appears, bearing nearly S.W. by W. By inclining a couple of reflectors, the light may also be thrown immediately down upon the South reef, at the base.

SOUTH REEF is a ledge of rocks extending nearly a cable's length to the northward from the base of the Inner South head, and is the only projecting spit to attend to between the Inner South and North heads: it is easily seen in the daytime, by the sea constantly breaking upon it; and now that the Inner head is distinguished by a light at night, the head need only be given the usual berth to ensure clearing the reef.

The water is deep along the coast between the Outer and Inner South heads, there being 14 fathoms at a quarter of a mile, and from 4 to 9 fathoms within a cable's length of the shore; but the cliffs are so precipitous as to afford no refuge in the event of shipwreck.

OUTER NORTH HEAD, on the north side of the entrance of Port Jackson, is a table-surfaced, sharp-elbowed, perpendicular cliff, N. by E. $\frac{1}{4}$ E. $1\frac{1}{4}$ miles from the South head signal station. The east coast of the North head promontory is a high precipitous cliff, first trending from the Outer head N. $\frac{3}{4}$ E. one mile, and then nearly N.W. three-quarters of a mile, to Cabbage Tree bay; this coast is also bold, there being from 4 to 13 fathoms water at a cable's length from the shore.

INNER NORTH HEAD, W. $\frac{1}{2}$ N. nearly three-quarters of a mile from the Outer head, is a projection of the cliffy coast extending from the Outer head, and forms the north side of the entrance of Port Jackson.

The **ENTRANCE** of **PORT JACKSON** is $1\frac{3}{4}$ miles wide, between the Outer North and South heads : but the narrowest part, or what may be considered the actual entrance of Port Jackson, lies between the Inner heads, where it is a little more than three-quarters of a mile across from cliff to cliff, N. by E. $\frac{1}{2}$ E. and S. by W. $\frac{1}{2}$ W. ; but this breadth is reduced by a rocky spit on each side, to barely three-quarters of a mile. The entrance is clear of dangers, and the soundings are regular ; the depth in mid-channel being 17 fathoms, sand. Although there is a depth of 9 to 12 fathoms within a cable's length of the northern shore, the sea generally rolls in and breaks heavily upon the cliff.

The **SOUND** is the name recently given to the part of Port Jackson immediately within the entrance, and which branches off into Spring cove and North and Middle harbours. Although the Sound occupies an area of nearly $1\frac{1}{2}$ square miles, with regular soundings in 8 and 9 fathoms, it is too exposed to the ocean swell to afford safe anchorage, except with off-shore winds.

SPRING COVE and **QUARANTINE ESTABLISHMENT**.—From the Inner North head the cliffs recede to the north-westward for about half a mile, terminating at a hummocky point, upon which is the quarantine signal station : this forms the sheltering point of Spring cove, where 4 or 5 vessels, in moderate weather, may get into safe anchorage, to ride out quarantine. The quarantine establishment and burial ground are situated at about a quarter of a mile from the cliff, between Spring cove and the Inner North head.

NORTH HARBOUR is a deep bight to the north-westward of Spring cove, with regular soundings of 6 to 8 fathoms, and, although not apparently open to the fury of south-east gales, it is a treacherous anchorage ; but if a vessel, after running for Spring cove, finds its limited space so filled by vessels as to prevent her taking up a berth, she may anchor in 6 fathoms, at about a quarter of a mile to the northward of the north point of Spring cove, at a cable's length from the eastern shore, and in some measure be sheltered from the sea, which south-east gales send into the middle and western portions of North harbour.

HUNTER BAY and **MIDDLE HARBOUR**.—The first inlet which opens to view from the fairway track between Sydney heads, in a W. by N. direction, is the entrance to Hunter bay and Middle harbour, which is one mile within the heads and four-tenths of a mile broad, between Middle head and Grotto point. Nothing, however, should tempt a large vessel to enter Hunter bay when blowing hard from the eastward, as it is then a sheet of broken water, although with depths of 5 fathoms ; this would defy any ground tackle, and smother a laden craft, the draught of which

From them, stretch from the north-westward, presenting a low ground extend S.S.W. a mile, from the beacon, with an 18-foot ridge to shoals, which separate the other patch, N.N.E. $\frac{1}{4}$ E. as little as 16 feet water in the Bar, as it lies in and is open to the full in the most shallow part of the West channel, that direction.

The *red*, is moored in north-westward of the end of the Sow and Pigs. The light-vessel shows a light vertically $6\frac{1}{2}$ feet above the water, at the W. and S.W. $\frac{3}{4}$ W.; and, to the southward,

on the western side of the water, over a sandy beach on George head and so it is not more than 10 fathoms. The light-vessel channel, which is clear in all weather, by any one

other side of West

an imposing white light-vessel, clears the 16-foot water in the Sow and Pigs

highest object about 100 feet shoal extending

on the eastern shore of a point, the north

might prevent her crossing the 9-foot bar, between Hunter bay and Middle harbour.

Middle harbour, which trends to the north-westward from Hunter bay carries from 15 to 5 fathoms water for about three-quarters of a mile above the bar; when, after narrowing to a cable in width abreast of Hillery spit, it turns to the westward, into a 16-fathoms estuary, which branches into deep creeks, leading to no settlement or object for traffic, except the firewood upon its banks, which some Sydney lighters find profitable.

MIDDLE HEAD, W.N.W. two-thirds of a mile from Inner South head, is a lofty, precipitous, bold bluff of whitish freestone, immediately facing the entrance of Port Jackson. As it is exposed to the ocean swell, the sea breaks upon it with great violence during easterly gales.

WESTERN OBELISKS and LEADING MARK A.—Two obelisks, each 30 feet high, have recently been erected upon the western shore, facing the entrance to the Sound: that nearest the sea is situated at the edge of the first elbow of the coast, immediately to the southward of Middle head; the western, and upper obelisk stands upon the wooded slope, and bears W. $\frac{1}{2}$ S. from the former. These two kept in line, give the leading mark A, for clearing the South reef and the northern edge of the Bar and Flats.

Obelisk bight is a small bay lying midway between Middle and George heads, the latter bearing S. by W. $\frac{3}{4}$ W. three-quarters of a mile from the former head: a 3-fathoms shoal extends from George head one-quarter of a mile towards Middle head.

BRADLEY POINT, the southernmost projection of the north shore of Port Jackson, lies S.S.W. $\frac{1}{2}$ W. nearly $1\frac{1}{4}$ miles from George head, and has a shoal spit extending about half a cable's length to the southward from it. Between George head and Bradley point are Chowder and Taylor bays, separated from each other by Chowder head.

THE BAR AND FLATS and SOW AND PIGS, which extend across the actual mouth and threshold of the Sydney and Paramatta estuary, limit the capacity of the harbour to the admission of vessels of 20-feet draught at low water, springs, or 25 feet at high water, in fine weather; for if boisterous from seaward, or a gale is coming on from that quarter, the Bar is subject to a swell, which requires an allowance of a fathom scend.

The nucleus of this Bar consists of a group of rocks, showing at half tide, and marked by an iron beacon rod, surmounted by an open hooped ball. This beacon is fixed nearly midway between the shores on either side, and the outer and inner edges of the flats, which spread over two-thirds of a mile North and South, and extend from shore to shore, across the entrance, which is here three-quarters of a mile wide.

Two sunken spurs, with only 7 feet water upon them, stretch from the beacon about half a cable's length to the north-westward, presenting an abrupt elbow to West channel. Spits of rough ground extend S.S.W. a quarter of a mile, and S. by E. one third of a mile, from the beacon, with from 12 to 18 feet water upon them; these, with an 18-foot ridge to the westward of them, form the Sow and Pigs shoals, which separate the East from the West channel. But there is another patch, N.N.E. $\frac{1}{4}$ E. nearly one-third of a mile from the beacon, with as little as 16 feet water upon it, and which is the most dangerous shoal upon the Bar, as it lies in the fairway between the Sound and the light-vessel, and is open to the full scend of the ocean swell. This patch, which is the most shallow part of the northern edge of the Bar, separates the East from the West channel, as the shoals just described to the southward, do in that direction.

THE SOW AND PIGS LIGHT-VESSEL, painted *red*, is moored in 21 feet water, at half a cable's length to the north-westward of the outer of the two spurs forming the north extremity of the Sow and Pigs shoals, and at one cable's length from the beacon. The light-vessel shows a *red* flag by day, and two *fixed white* lights, placed vertically $6\frac{1}{2}$ feet apart upon one mast, by night. The upper light is 26 feet above the water, and visible from the north-eastward in clear weather, at the distance of 6 miles, bearing between S.W. by W. $\frac{3}{4}$ W. and S.W. $\frac{1}{4}$ W.; the bearings being thus limited by the Inner South head, to the southward, and the Outer North head, to the northward.

WEST CHANNEL, which crosses the Bar and Flats on the western side of the Sow and Pigs shoals, carries 21 feet at low water, over a sandy bottom: the most narrow part of the channel is between George head and the west extreme of the Sow and Pigs shoals, where it is not more than $1\frac{1}{4}$ cables wide between the 3-fathoms edges of the shoals. The light-vessel is situated so as to render this the available night channel, which may be taken without a pilot, in moderate and clear weather, by any one who has studied the plan and directions.

LEADING MARKS for clearing the shoals on either side of West channel:—

C.—Bradley point, in line with Elizabeth house, an imposing white square building, with a round dome, bearing S.W. by S., clears the 16-foot patch on the northern edge of the Bar and Flats, and the Sow and Pigs shoals, on their western sides.

D.—Bradley point in line with Craigend mill, the highest object about Sydney heights, bearing S.S.W. $\frac{3}{4}$ W., clears the 18-foot shoal extending north-eastward from George head.

WATSON BAY.—From the Inner South head, the eastern shore of Port Jackson trends S. $\frac{1}{4}$ W. half a mile to Green point, the north

extreme of Watson bay. Parsley and Vacluse bays, which are separated by Vacluse point, are two small bights forming a southward continuation of Watson bay; the three bays having one common entrance, which is four-tenths of a mile across, S.S.W. $\frac{3}{4}$ W. from Green point to Bottle and Glass spit. Both points of the entrance are closely begirt with sunken rocks; and from Bottle and Glass spit, foul ground borders the shore for nearly half a mile to the south-westward, terminating at Shark point.

Watson bay is the pilot station; and as there is smooth anchorage, in 6 to 7 fathoms water, outward-bound vessels frequently anchor here, to wait for a fair wind.

EASTERN OBELISKS, which are erected for leading into East channel over the Bar and Flats, will not come in sight until a quarter of a mile within the Inner South head; then the northern and smaller of the two obelisks, which is but half the size of the other, will be seen at the high-water mark on Green point. The southern, and taller obelisk is 25 feet high, and stands on the south-east trend of Vacluse point, upon nearly the same level as that on Green point, from which it bears S. $\frac{1}{2}$ E., distant a little more than half a mile. These obelisks being constructed of whitish sandstone, and well brought out to view by the thickly wooded background, form a good leading mark, while their distance of half a mile apart renders any deviation from the transit quickly perceptible.

EAST CHANNEL.—Now that the entrance of East channel across the Bar and Flats is defined by leading marks, with equally deep, and much smoother water, and as it is but half the distance, as compared with West channel, it may be expected that East channel will be more frequently used; but the necessity for suddenly hauling up at right angles when entering from seaward, with a south-east breeze, is occasionally a great disadvantage to this channel. The outer narrows of East channel, where the soundings quickly decrease from 8 to 4 fathoms, lie between the South reef and the north-easternmost 16-foot patch of the Sow and Pigs shoals, forming the northern entrance of the channel, which is there nearly a quarter of a mile wide; the leading marks for, and through the centre of which are the two Eastern obelisks just described.

LEADING MARKS for East channel, and cross mark for the southern edge of the Sow and Pigs shoals:—

E.—The two Eastern obelisks in line, S. $\frac{1}{2}$ E., lead into, and through the northern entrance of the Eastern channel.

F.—St. James's church spire—the only spire which makes out in Sydney—its breadth open of Bradley point, bearing S.W. $\frac{1}{2}$ W., leads clear of the south-eastern 17-foot elbow of the Sow and Pigs shoals.

II.—The Outer South head light-house, its breadth open to the southward of the old whitish obelisk, upon the wooded slope near Watson bay, bearing S.E. by E. $\frac{1}{2}$ E., shows that the south-western, or inner edge of the Bar and Flats has been passed.

Port Jackson above the Bar and Flats is so free from dangers, and is so clearly represented on the Plan, that a few of the islands and most prominent points, bordering the thoroughfare, need now be only briefly noticed.

SHARK ISLAND is small and thickly wooded, of moderate height, and lies E. by S. $\frac{1}{2}$ S. two-thirds of a mile from Bradley point; a spit of foul ground extends nearly a cable's length from its north-west end.

CLARK ISLAND, S. by W. $\frac{1}{4}$ W. two-thirds of a mile from Bradley point, is similar in aspect to Shark island, but much smaller; and the water is deep round it.

GARDEN ISLAND, which lies nearly one mile to the south-westward of Bradley point, is considerably larger and higher than the others: it may be approached, northward, to half a cable's length; but a shallow spit runs out from its south point. Garden island is, with certain ordnance reservations, appropriated to naval purposes. It affords a quiet spot for astronomical and other observations. The slab for observing upon, is in lat. $33^{\circ} 51' 54''$ S., long. $151^{\circ} 14' 47''$ E., from which the true bearing of the Outer South head light-house is N. 82° E.; the variation being 10° E.

FORT DENISON and LIGHT.—Fort Denison, formerly called Pinchgut islet, lies about a quarter of a mile to the north-westward of the north end of Garden island. This islet, unlike the others just described, is a mass of bare rock and masonry, with a martello tower on its north-east extreme, which shows a *fixed red* light, for the more especial purpose of guiding steamers and coasters. Vessels from foreign ports, are forbidden by the port regulations to pass this light until boarded by the health officer and other authorities. There is deep water round the islet; but it should not be passed within half a cable's length, on account of two small spits running out a short distance from it.

FORT MACQUARIE.—GEOGRAPHIC POSITION.—Fort Macquarie, from which the longitudes of the recent surveys of the coasts of Australia and New Zealand have been measured, is in lat. $33^{\circ} 51' 42''$ S., long. $151^{\circ} 14'$ E. The fort is situated at the north extreme of the point which separates Farm cove from Sydney cove. Shoal water runs out about a cable's length from the point, the spit being marked by a *red* buoy.

MAN-OF-WAR ROAD and FARM COVE.—The custom of the port reserves Farm cove for the anchorage of men-of-war; but, as four large vessels could not berth in Farm cove, Man-of-war road may be con-

sidered to extend from Fort Macquarie to Garden island, as merchant vessels scarcely ever need, and are not expected, to anchor within that space.

Farm cove lies immediately to the eastward of Fort Macquarie, and directly in front of Government house: it affords good anchorage in 7 fathoms, muddy bottom, with Fort Macquarie point and Dawes point in line, bearing W. by N. $\frac{1}{2}$ N., and Government house S.W.

Water.—There is a small camber for boats, inside a jetty on the west side of Farm cove, at about half a cable's length from Fort Macquarie, with a turn-cock jet of excellent water at the end of the jetty, at which Government boats can, without charge, water at all times of tide; and by warping a vessel in, properly managed hoses might be led from the turn-cock directly into the tanks.

KIRIBILLI POINT, the most prominent projection of the north shore of Port Jackson, to the westward of Bradley point, lies N.N.E. one-third of a mile from Fort Macquarie, and nearly in line with Bradley point and the Outer South head light-house. A rocky spit extends half a cable's length from Kiribilli point, which, with Fort Macquarie spit, reduces this part of the harbour to a quarter of a mile in breadth.

CAREENING POINT and GREAT SIRIUS COVE.—The former is a high, narrow tongue of land, extending from the north shore to the centre of the bay, between Bradley and Kiribilli points. Great Sirius cove is a deep narrow creek running up nearly two-thirds of a mile on the eastern side of Careening point, at the head of which is a heaving-down establishment.

The FAIRWAY of Port Jackson may be divided into three sections: the first, W.N.W. $1\frac{1}{4}$ miles from the line of the Outer heads; the second S.S.W. $2\frac{1}{4}$ miles across the Bar and Flats and up the sea reach to abreast of Bradley point; and the third, which is the harbour reach to Sydney cove, W. $\frac{1}{2}$ S. $1\frac{3}{4}$ miles, being but a run of $5\frac{1}{4}$ miles altogether, and which at an eight-knot rate, is to be accomplished, against the ebb, in three-quarters of an hour, and in half an hour with the flood stream.

The first reach and the East and West channels across the Bar and Flats, having already been described, the second reach, from thence to abreast of Bradley point, and the third reach now remain to be noticed.

The average breadth of the harbour between the Bar and Flats and Bradley point, is about half a mile; the soundings in mid-channel ranging from 7 to 16 fathoms, with sandy bottom. Between Bradley point and Shark island, the working room is nearly half a mile, allowing for the rocky spits which project about a cable's length on either side. Shark, Clark, and Garden islands may be considered as forming the southern boundary of the fairway channel; but in working, vessels may

advantageously make longer boards to the southward, between the islands, towards Rose, Double, and Rushcutier bays. They may also, when past Bradley point, stand to the northward on either side of Careening point, which will afford from two-thirds of a mile to nearly half a mile working room, merely keeping about half a cable's length clear of the spits running out from the points, to the westward of Bradley point. There is easy anchorage, in 10 fathoms, anywhere in mid-channel, and no tide stream to prevent a smart vessel, under a top-gallant breeze, turning to windward.

The ship channel, at about one-third of a mile above Fort Denison, whether leading to Sydney cove, Darling harbour, or to Waterview, or Cockatoo dock, is contracted to about a quarter of a mile in width between the points, the narrowest part being between the spits extending from Fort Macquarie and Kiribilli points.

It is not here deemed necessary to enter into a detailed description of Port Jackson above Fort Macquarie, as a vessel having arrived thus far, will be berthed by the Portmaster's directions, according to her destination ; and the various commercial localities, and other details of the kind, will be best understood by reference to the Plan.

ANCHORAGE.—The Sound only affords temporary anchorage, with off-shore winds, to the northward of the Bar and Flats, where vessels may wait for a steam-tug, or for a favourable opportunity for crossing the Bar and Flats. But there is good anchorage in Watson bay, and immediately to the south-westward of the Sow and Pigs shoals ; and, should a vessel be baffled or assailed by those crippling gusts locally known as southerly "*busters*," or get perplexed as to threading her way amongst the shipping, she can find good anchorage, in not more than 13 fathoms, with good holding-ground, anywhere in the harbour reach, by merely giving the islets and points a berth of 2 or 3 cables' lengths. At night, when anchored in the way of passing vessels, a light is required to be shown.

Few harbours possess so much room with smooth water, as Port Jackson, from its branching into numerous arms and deep inlets, with steep projecting points between them ; almost every yard of shore presenting a natural wharf.

The localities where wharves and stages have been constructed which admit of cargo being rolled in and out of a vessel, are Sydney cove, with 1,100 yards of berthage ; the bight between Dawes and Miller points, 800 yards ; and along the eastern shore of Darling harbour, 2,300 yards of shore, which by simple staging, without the expensive aid of docks or basins, admit of shipping accommodation, in from 18 to 20 feet, at low water. The approaches to berths, and the process of berthing, are equally

simple, and these being entirely the business of the pilot and Portmaster, no directions are necessary on that head.

DOCKS, PATENT SLIPS, and CAREENING ESTABLISHMENTS.—

Every facility is to be obtained at Sydney for repairing vessels of any size or description, with abundant supplies and stores of every kind.

Fitzroy Dock is the Government dry dock at Cockatoo island, at about 2 miles above Sydney cove. The dock has a depth of $20\frac{1}{2}$ feet over its caisson-sill, at high water, springs, 19 feet at neaps, and is 58 feet wide at the entrance; in 1861, it was capable of receiving a vessel of 350 feet over all, and, when completed, 400 feet.

Morts Dock is a private dry dock in the bight of Waterview bay, on the south side of the harbour, at about $1\frac{1}{2}$ miles above Sydney cove. This dock is 345 feet long and 69 feet wide at the entrance, with a depth of 19 feet at high water, springs, and $17\frac{1}{2}$ feet at neaps, over its sill; like Fitzroy dock, it is pumped out by a steam-engine.

Pymont Patent Slip, at Darling point, on the western side of Darling harbour, belongs to the Australian Steam Ship Company. It is 850 feet long, 400 feet of which incline beyond low water mark into 28 feet depth, and it carries a cradle 190 feet long, upon ways 36 feet wide. The engine power is capable of hauling up a vessel of 2,000 tons in 5 hours.

Towns and Darleys Patent Slip is a smaller, but much used patent slip, situated on the eastern shore of Darling harbour. It is about 400 feet long, with its extremity 15 feet under water, carrying a cradle 21 feet wide, and worked by an adequate engine.

Vessels are occasionally hove down to the wharves in Darling harbour, and likewise in Great Sirius cove.

Steam Tugs.—There are steam tugs at Sydney, which may be summoned by signal when required.

PILOTS.—The pilot station is at Watson bay, within half a mile of the signal station on the Outer South head, and the look-out is kept at the Signal tower, from which the night signals of vessels requiring pilots will be answered. Pilots are ordered to keep night watch on the cliffs for vessels approaching the harbour, and to answer any signal that may be made, by showing a blue-light. Marryat's signals or the new merchant code may be used; and there is, as already stated, an electric telegraph office at the Signal station, communicating with Sydney.

Pilot Schooners.—A three-masted pilot schooner, marked "No. 1" on the bow and main-sail—shortly to be followed by a similar vessel, marked "No. 2"—was some years ago stationed outside the heads of Port Jackson, with instructions to make an offing of 8 to 10 miles during the day. They show the usual *red* and *white* flag, keeping within sight of the South

Head signal station, to learn from it the position of any approaching vessel requiring a pilot.

At night the pilot-vessel will close the heads, taking such a position as the weather will permit, and best suited to intercept a vessel making for the harbour. She will show the usual *red* light to port and *green* to star-board, a bright light at the foremast head, and every quarter of an hour, a flash-light in the waist.

Pilot Regulations.—Qualified persons, having received licences to act as pilots, are to board all vessels arriving off the heads of Port Jackson, except such as shall have a *white* flag flying at the main-mast head, which will denote the vessel to be by law exempt from the necessity of accepting the services of a pilot; and such pilots are to produce their licences whenever required so to do by the masters of such vessels. (3 William IV., No. 6, sec. 13.) The master of a vessel shall not be entitled to claim exemption from the payment of pilotage, unless when within one league of the entrance of any port or harbour, a signal be also hoisted in some conspicuous part of the rigging, according to the numeral pendant used for such purpose, indicating the port from which such vessel has arrived. (11 Victoria, No. 15, sec. 3.)

The master of every vessel not by law exempt from the necessity of accepting the services of a pilot, is to place her in charge of the first licensed pilot that may come alongside; and such master is not to enter the harbour, or proceed to sea, or quit his anchorage without having a licensed pilot on board, under penalty equal to the amount of pilotage to which he would have been subject if a pilot had been employed. (3 William IV., No. 5, sec. 13.)

There shall be payable and paid at every port at which there shall be a pilot establishment, a pilotage rate upon every vessel, except as herein-after excepted, of 4*d.* per ton on her arriving at, and on her departing from such port, and one moiety of such rate in any case of her being compelled to return into such port after having put out to sea; provided that in respect of any such vessel, the amount of such rate shall not be in any case less than 5*l.* for the port of Sydney, Newcastle, or Moreton bay, nor less than 2*l.* 10*s.* for any other port of the colony. (22 Victoria, No. 4.)

All steam vessels, coasters, or other vessels actually trading between any port in this colony and any other such port, or between any such port and any port in any of the colonies of Victoria, South Australia, Western Australia, Tasmania, or New Zealand, or in the whaling trade, and being registered in this, or one of such colonies, or in the United Kingdom, shall, except in cases where the master thereof shall actually require and employ the services of a pilot, be subject to one payment only of the pilotage rate of 4*d.* per ton fixed by this Act for each whole year in respect of any port

in this colony; provided that such payment be made to the collector of Customs of any such port before the end of March in such year.

Exemption Flags and Lights.—The masters of all steam vessels, coasters, or other vessels actually trading between any port in this colony and any other such port, or between any such port and any port in the colonies of Victoria, South Australia, Western Australia, Tasmania, or New Zealand, or on a whaling voyage, must, if wishing to claim exemption from the payment of pilotage under the Act of Parliament, 22 Victoria. No. 4, on arriving within three leagues of the port to which they are bound, exhibit a *white* flag at the main top-mast head, of not less dimensions than 3 feet at the hoist by 3 feet in the fly, and must keep the same flying until they have anchored in the port.

The pilot board may grant to the master of any vessel mentioned in the third section, a certificate of competency for any port or ports of the Colony, upon being satisfied that such master is so qualified as to be entitled to such certificate; and there shall be paid to such board for every such certificate a fee of 5*l.* and no more.

Harbour Dues payable to the Harbour master for repairing on board, and appointing the place of anchorage, for ships or vessels entering any port or harbour in New South Wales, and for each removal of the same from one place of anchorage or mooring to another, not being for the purpose of leaving the port (vessels registered in Sydney under 50 tons, or while employed in the coasting trade from one port of New South Wales to another, excepted):—

			£	s.	d.
For every vessel under 300 tons	—	—	—	1	0 0
„ of 300 tons and under 400 tons	—	—	—	1	5 0
„ 400	„	500	—	1	10 0
„ 500	„	600	—	1	15 0
„ 600	„	800	—	2	0 0
„ 800	„	1000	—	2	5 0
„ over	—	—	—	3	0 0

CUSTOM HOUSE.—Masters of vessels arriving in Port Jackson, are hereby informed that by the 13th section of the Act 9 Victoria, No. 15, they are required to give into the Custom House a true and proper account in writing, of all dutiable goods, whether cargo or stores, on board their respective vessels, under a penalty not exceeding 100*l.* nor less than 10*l.*; and that by the 9th section of the same Act all goods liable to duty on importation, not duly reported, shall be forfeited. They are farther informed that, as great inconvenience has arisen from the careless way in which reports inwards have been frequently made, the law will in future be strictly enforced.

Goods to be carried coastwise are not to be laden, or having been brought coastwise, are not to be unladen, until written notice has been given to the proper officer, and proper documents granted ; and such goods are to be laden or unladen only at the times and places, and in the manner, and by the persons, and under the care of such officers as shall be appointed by the Collector of Customs, under penalty of the forfeiture thereof and of 10*l.*, to be paid by the master of the vessel lading or unlading the same. (10 Victoria, No. 9, sec. 4.)

Goods to be carried coastwise must be laden at some port or place in the Colony. Coasting vessels not to take out, or receive any goods at sea, or touch at any place over the sea, or deviate from the voyage, unless through unavoidable circumstances. Any place so touched at to be reported to the collector at the first port in the Colony visited, under penalty of 200*l.* (10 Victoria, No. 9, sec. 3.)

No goods, except personal luggage of passengers, may be shipped or unshipped from coastwise vessels at any place where any officer of customs shall or may be hereafter stationed, unless in the presence, or by the authority of the proper custom-house officer. (10 Victoria, No. 9, sec. 10.)

All goods liable to the payment of duty, unshipped from any vessel without the duty being first paid or secured, to be forfeited, as well as any prohibited goods imported into the Colony, or any goods clandestinely removed after being warehoused, together with houses, other animals, and all carriages and boats used in their removal. (9 Victoria, No. 15, sec. 93.)

All vessels, the property of Her Majesty's subjects, trading from one port of the Colony to another, will be considered as engaged in the coasting trade. (10 Victoria, No. 9, sec. 2.)

Every person engaged in unshipping goods liable to forfeiture, or in landing, removing, or harbouring the same, or into whose hands they may knowingly come, is liable to forfeit either three times the value thereof, or a penalty of 100*l.*, at the election of the officers of customs. (9 Victoria, No. 15, sec. 98.)

Every person concerned in unshipping goods which are prohibited, or the duties on which have not been paid, or in concealing or illegally removing the same from the place of deposit, is liable to forfeit either three times the value thereof, or a penalty of 100*l.*, at the election of the officers of customs. (9 Victoria, No. 15, sec. 101.)

Every person obstructing an officer of the Navy on full pay, or any officer or officers of customs, or any person acting in his or their aid or assistance, or duly employed for the prevention of smuggling, such person being at the time in the exercise of his office, is liable to a penalty of 100*l.*

for every such offence; and every person so obstructing, with force or violence, any person so employed, is liable to be imprisoned for any period not exceeding three years. (9 Victoria, No. 15, sections 104 and 105.)

Vessels not exceeding 50 tons, and employed in the coasting trade from one port of New South Wales to another, the vessels of all nations outfitting for or refitting from the fisheries, and all vessels arriving and sailing in ballast, or which may not break bulk, or only to such extent as may be necessary to provide funds for the repairs, refittings, or refreshment required, are wholly exempted from all port charges whatsoever, except only those of pilotage.

No vessel shall be entitled to her clearance at the custom house until the master shall have paid all the pilotage dues. (22 Victoria, No. 4, sec. 11.)

LANDING PLACES for BAGGAGE.—No passenger's baggage shall be landed from vessels arriving in the harbour of Port Jackson from parts beyond the seas, or any of the neighbouring colonies, and anchored in the stream or offing, except at the Circular quay in Sydney cove, or at the wharf in Darling harbour, at the foot of Erskine street, and the wharf at the foot of Margaret place, Darling harbour, since proclaimed, or such other wharves as may be hereafter appointed by the collector of customs; and if any such baggage shall be landed at any other wharf, stairs, or landing place, the same shall be forfeited, together with the boat in which such baggage has been conveyed from the ship to the shore; provided nevertheless, that this Act shall not prevent the landing of baggage under the usual regulations for the landing of ballast from vessels lying alongside the several sufferance wharves, where an officer of customs is stationed. (17 Victoria, No. 19, sec. 1.)

POST OFFICE.—The master of any ship or vessel arriving in the harbour of Port Jackson, and every passenger or other person on board such ship or vessel, is bound to deliver on demand to the Postmaster General or port officer, or to any person duly acting for such Postmaster General or port officer, all mails, bags, boxes, packets of letters or newspapers, and also all loose letters or newspapers which may be on board such ship or vessel, excepting always letters concerning goods on board such ship or vessel, and to be delivered with such goods and letters, containing any conveyance or other deed, commission writ, or affidavit, and letters sent by way of introduction only, or concerning the bearer's private affairs; and any master, passenger, or other person on board of such ship or vessel, who shall delay the delivery of, or shall knowingly or negligently detain on board such ship or vessel, or keep in his or her possession, any mail-bag, mail-box, packet of letters, letter, or newspaper, except as aforesaid, after such demand made as aforesaid, shall

forfeit and pay for every letter or newspaper so delayed, detained, or kept, a penalty or sum not exceeding 5*l*. (15 Victoria, No. 12, sec. 33.)

The master or commander of any ship or vessel arriving in the harbour of Port Jackson shall repair to the post office as soon after his arrival as shall be practicable, and shall then subscribe a declaration that he has, to the best of his knowledge and belief, delivered or caused to be delivered, to the person duly authorized to receive delivery thereof, every letter bag, package, or parcel of letters, or packets, except such letters as are exempted by law from postage; and until such declaration shall have been made, and a certificate of the making thereof, under the hand of the officer taking the same, shall have been produced to the collector or comptroller or principal officer of customs, he shall not permit such ship or vessel to report; and any master or commander failing or neglecting to take such declaration, or making a false declaration, shall forfeit and pay a penalty or sum not exceeding 50*l*. (15 Victoria, No. 12, sec. 34.)

If the master of any ship or vessel, about to depart from the Colony, shall refuse or wilfully neglect to receive on board such ship or vessel any mail, or bag, or box of letters, or to give a receipt for the same, or shall refuse or neglect carefully to deposit such mail or bag or box in some secure and dry place on board of such ship or vessel, or to convey the same upon her then intended voyage, such master or person shall for every such offence forfeit and pay a penalty or sum not exceeding 100*l*. (15 Victoria, No. 12, sec. 37.)

If any master, commander, or other person having the charge of any steam-boat or other vessel proceeding, or about to proceed from any port or place within the colony to some other port or place within the same, shall refuse or neglect to receive any such post-office mail on board such steam-boat or other vessel, or to give a receipt for the same, being thereto required, he shall forfeit and pay a penalty or sum not exceeding 50*l*. (15 Victoria, No. 12, sec. 38.)

GUNPOWDER.—Vessels arriving with gunpowder on board, exceeding the quantity they require as stores, are to hoist an Union-jack at their main, and are not to proceed higher up the harbour than Neutral bay until the gunpowder is landed, according to law; and vessels taking gunpowder on board are not to do so higher up than Neutral bay, under penalty in each case of 10*l*. (3 William IV., No. 6, Schedule A., par. 1.)

All vessels arriving with gunpowder on board are immediately to report the same to the Collector of Customs and Ordnance Storekeeper, the latter of whom is to grant a permit for the removal thereof to one of Her Majesty's magazines as early as possible. (7 William IV., No. 7, sec. 2.)

All vessels are required to land at the Government magazine whatever gunpowder they have on board, whether as cargo or stores, before they enter Sydney cove or Darling harbour ; and the master of any vessel in either of those places, on board which any gunpowder may be found, is liable to a fine not exceeding 1*l.* sterling for every pound weight of gunpowder so found ; 12 hours after anchorage being allowed for landing such gunpowder, not exceeding 20 pounds in weight, as may have been brought up in such vessel as stores. (5 Victoria, No. 11, sec. 1 ; and 13 Victoria, No. 24, sec. 2.)

No gunpowder from any of the Government magazines is to be landed elsewhere in the harbour of Port Jackson than at the point near Dawes battery, and such landing is to take place only between the hours of 6 and 10 in the morning, under penalty of 2*s.* for every pound weight landed or attempted to be landed. (19 Victoria, No. 6.)

All boats used for the conveyance of gunpowder are to be provided with tarpaulins, and to be properly housed over, under penalty of 10*l.* (5 Victoria, No. 11, sec. 2.)

All gunpowder so removed as aforesaid, is to be in packages or barrels closely joined or hooped, without any iron about them, and no one such package or barrel is to contain more than 100*lbs.* in weight ; and the said packages or barrels are to be so secured, that no part of the gunpowder can be scattered in the removal thereof ; and in case of failure in this respect, the Ordnance Storekeeper for the time being, or other person duly authorized in that behalf, is empowered to remove the contents of the said packages or barrels into secure and proper packages, and to charge the expense attending the same to the importer or proprietor of such gunpowder ; and the said Ordnance Storekeeper may refuse to deliver the gunpowder so removed into fresh packages, until such expenses are paid. (7 William IV., No. 7, sec. 5.)

Officers of Her Majesty's Customs may seize without warrant any gunpowder which may be found on board any ship or vessel contrary to law. (13 Victoria, No. 23, sec. 3.)

No gunpowder or other explosive material, or vitriol, or other such mineral acid, shall be shipped or delivered without a special notification to the Collector of Customs, nor without a plain brand or superscription, showing what material the package contains and the quantity thereof. Any person guilty of a breach of this regulation shall be deemed guilty of a misdemeanor, and may be fined or imprisoned at the discretion of the court. (18 Victoria, No. 21.)

LIGHTS and REGULATIONS to avoid COLLISION.—All steam vessels, whether propelled by paddles or screws, shall within all seas, gulfs, channels, straits, bays, creeks, roads, roadsteads, harbours, havens, ports,

and rivers within the Colony of New South Wales, and under all circumstances, between sunset and sunrise, exhibit lights of such description and in such manner as is herein-after mentioned, viz. :—

When under Steam.—A bright light at the foremast head ; a *green* light on the starboard side ; a *red* light on the port side.

1. The mast-head light is to be visible at a distance of five miles in a dark night with a clear atmosphere, and the lantern is to be so constructed as to show a uniform and unbroken light over an arc of the horizon of 20 points of the compass, being 10 points on each side of the ship, viz., from right ahead to 2 points abaft the beam on either side.

2. The *green* light on the starboard side, is to be visible at a distance of at least 2 miles in a dark night with a clear atmosphere, and the lantern is to be so constructed as to show a uniform and unbroken light over an arc of the horizon of 10 points of the compass ; viz., from right ahead to 2 points abaft the beam on the starboard side.

3. The *red* light on the port side, is likewise to be fitted so as to throw its light the same distance on that side.

4. The side lights are moreover to be fitted with screens on the inboard side, of at least 3 feet long, to prevent the light being seen across the bow.

5. The master of any steam vessel while under way during thick or foggy weather, shall, in addition to the lights already provided to be carried, cause a bell to be rung, or a steam whistle to be sounded, every minute, and whenever a steam vessel while under way, shall be within any harbour or river within the Colony of New South Wales, between the hours of sunset and sunrise, he shall cause the above signals to be made by ringing the bell or sounding the whistle, and shall continue the same until the vessel shall have arrived at her wharf or anchorage.

When at Anchor.—A common bright light.

Sailing Vessels Lights.—All sailing vessels when under sail, or being towed, approaching or being approached by any other vessel, shall be bound to show, between sunset and sunrise, a bright light in such a position as can be best seen by such vessel or vessels, and in sufficient time to avoid collision, and when approaching any port or harbour at which a pilot station is established, shall exhibit on board of any vessel commanded by a person holding a certificate of exemption granted by the Pilot Board of New South Wales (in pursuance of 3d and 5th sections of the Act of Parliament, 22 Victoria, No. 4), at some conspicuous part of the vessel, between sunset and sunrise, two bright lights, to be suspended one over the other at a distance of 2 feet between the lanterns, and shall keep the same burning until anchored within the port or harbour.

All sailing vessels at anchor in roadsteads or fairways, shall be also bound to exhibit between sunset and sunrise, a constant bright light at the mast-head.

The lantern to be used when at anchor, both by steam vessels and sailing vessels, is to be so constructed as to show a clear good light all round the horizon.

The Members of the Steam Navigation Board revoke all regulations heretofore made by them relating to steam vessels carrying lights, and they require that the preceding regulations be strictly carried into effect on and after the 1st July 1859.

GENERAL REGULATIONS.—If any seaman or other person shall die on board any vessel in the harbour of Port Jackson, the master of such vessel shall cause the body to be brought on shore and interred, under a penalty of not more than 20*l*. (4 Victoria, No. 17, sec. 22 ; and 7 Victoria, No. 21, sec. 6.)

Any person throwing a dead animal into any part of the harbour of Port Jackson, to the westward of Fort Denison, without attaching to it a sufficient weight to sink it, is liable to a penalty of not more than 5*l*.

Any person who shall throw or cause to be thrown any dead animal into any part of Sydney cove or Darling harbour, or shall leave or cause the same to be left upon the shores thereof, is liable to apprehension by any constable, and to be detained in any watch-house or other place of security until brought before a justice.

No ballast, rubbish, gravel, earth, stone, wreck, or filth is to be thrown from any boat or vessel in the harbour of Port Jackson, or into any creek or river within the limits thereof, excepting only on land where the tide or water never flows, under penalty of not less than 5*l*. nor more than 10*l*.

Tarpaulins, properly stretched and spread, are to be used so as to prevent ballast from falling into the water during the time of its being taken into, or discharged from any vessel or boat in the harbour of Port Jackson, under penalty of 5*l*.

Seamen.—No seaman shall be engaged to serve on board any ship or vessel for any voyage by any person other than the master or owner thereof; nor shall any seaman be so engaged except at the office, and with the sanction of the Shipping master of the port in which such engagement shall take place; and every such engagement shall be entered by the Shipping master in a register book to be kept by him for that purpose; and the seaman and the master or owner engaging him shall respectively sign their names in such book, in testimony of such engagement.

SCALE of FEES at Shipping Office.

1. Engagement of Crews :				3. Discharge of Crews :			
	£	s.	d.		£	s.	d.
Vessels under 60 tons	- 0	5	0	Vessels under 60 tons	- 0	5	0
60 to 100 „	- 0	10	0	60 to 100 „	- 0	10	0
100 „ 200 „	- 0	15	0	100 „ 200 „	- 0	15	0
200 „ 300 „	- 1	0	0	200 „ 300 „	- 1	0	0
300 „ 400 „	- 1	5	0	300 „ 400 „	- 1	5	0
400 „ 500 „	- 1	10	0	400 „ 500 „	- 1	10	0
500 „ 600 „	- 1	15	0	500 „ 600 „	- 1	15	0
600 „ 700 „	- 2	0	0	600 „ 700 „	- 2	0	0
700 „ 800 „	- 2	2	6	700 „ 800 „	- 2	2	6
800 „ 900 „	- 2	5	0	800 „ 900 „	- 2	5	0
900 „ 1,000 „	- 2	7	6	900 „ 1,000 „	- 2	7	6
Above 1,000 „	- 2	10	0	Above 1,000 „	- 2	10	0
2. Engagement of Seamen separately :				4. Discharge of Seamen separately :			
Two shillings for each.				Two shillings for each.			

THE SOUNDINGS have been accurately ascertained within the range of the revolving light ; and will prove a valuable assistance in nearing the land in thick weather. East of the entrance of Port Jackson, at 20 miles off shore, the depth will be 100 fathoms, olive sand, from which it shoals regularly to 20 fathoms, close in with the land and with the entrance. To the northward of the port, 100 fathoms will be found farther off shore ; and, on the contrary, to the southward, this depth does not extend more than 14 miles ; the 100-fathoms edge of the sounding describing a serpentine line from lat. 33° 30' S., long. 151° 59' E., to lat. 34° 11' S., long. 151° 28' E.

WINDS and WEATHER.—From the early part of October to April, the coast in the vicinity of Port Jackson, is subject to tolerably regular sea and land breezes, the former blowing from N.E., and the latter from the westward. The sea breeze generally begins at 10 a.m., and subsides after sunset ; the land wind commences at about midnight, and continues until 8 a.m. The exceptions to this rule are north and south winds, which occasionally prevail, as do also the north-west hot winds ; these latter, after blowing for a period varying in duration from 12 to 72 hours, are usually succeeded by sudden violent gusts from S.S.E. to S.S.W., which generally settle into a gale from those quarters, accompanied with rain. The greatest vigilance exercised by masters of vessels possessing local experience, is frequently insufficient to prepare for the suddenness with which these gusts overtake them ; strangers, especially, should

therefore be particularly careful to be ready for the change during the time when the hot wind is blowing, or the brief calm which sometimes intervenes.

From April to October, after the gales which usually succeed the autumnal equinox are over, and before those which generally precede the spring equinox commence, the wind prevails strong from the westward, between N.W. and S.W., with fine clear weather, and occasional gales from the North or South, with rain.

Except during the equinoctial gales, the wind very rarely blows on shore with sufficient violence to endanger the safety of a well-appointed vessel; but in the spring equinox, when these gales set in from S.E. to East, accompanied with dense rain and a high barometer, they blow with great fury from 24 to 48 hours, and finish with a long, slowly declining gale from South to S.W.

The Barometer is, with local knowledge, of great assistance in showing the approach of bad weather; but it must not be implicitly relied on by strangers. As a general rule, the barometer stands low with westing in the wind; lowest with a north-west; high with easting in the wind; and highest in south-east gales.

The ordinary rotary changes of the wind are from North, veering to the westward; when the contrary is the case, such as from N.E. to East, and veering to the southward, bad weather may be looked for. After the strength of a south-west or southerly gale is over, the barometer will rise to about 30 inches, when fine weather and a gradual change of wind to the N.E. may be expected.

Fogs rarely occur, except in the summer months, and then seldom last longer than from day dawn to 10 a.m. When the sea breeze is blowing, it is accompanied by a thin haze, which envelopes the land and renders it indistinct; this haze is dispersed as soon as the land wind springs up.

DIRECTIONS.—The most unfavourable times for entering Port Jackson are in easterly gales, southerly "*bursters*," and light variable winds, with a ground swell rolling in upon the heads.

Easterly gales sometimes blow very hard, causing a heavy sea upon this coast, which not only breaks with great violence upon Sydney heads, but occasionally right across the entrance, and directly home to the Middle head; a vessel, however, scudding in, must approach within 3 cables' lengths of Middle head, at the risk of being swept upon it by the hurling sea whilst hauling up, almost at right angles, to cross the Bar and Flats, and weather George head, upon which the sea breaks also. Easterly gales are frequently attended by haze-banks, which might prevent the lights being seen at night, until too late for a vessel to claw off the land; vessels should therefore, day or night, keep the sea rather than bear up for Port Jackson

in a gale from the eastward, and should not approach the coast within 10 miles, at which distance the Inner South Head light, if seen, will be dipping, and the soundings will be 70 fathoms, dark sand. It must be borne in mind, when getting an offing, that the weather gauge will be to the north-eastward as the gale expends itself, and that in standing to the northward the vessel is safe as long as the Outer South Head light is not shut in by the Outer North head, which it will be, upon the bearing of S. by W., and then the soundings will begin to shoal to about 20 fathoms, within which line no vessel should approach the coast.

The southerly "*bursters*" are strong squally winds, which rush down the harbour, and frequently embarrass sailing vessels when working up between the heads, sometimes taking them aback, and exposing them to destruction against the North Head cliffs; vessels should therefore wait outside until the wind becomes more steady, unless she is in very good working order and the flood stream is in her favour.

Vessels should not attempt to enter between the heads with light variable winds, as, under such circumstances, they frequently become unmanageable, and, being left to the mercy of the ground swell, may be set upon either of the heads: to anchor and wait for a steady breeze, or summon a steam tug, would obviously be the best way of getting out of this difficulty, before getting too near the heads.

If a vessel bound to Port Jackson should, from want of observations, be uncertain of her latitude, and fall in with the land either to the southward or the northward of it, in blowing weather, she may find shelter in Botany bay, to the southward, or Broken bay, to the northward, according to circumstances.

Vessels approaching Port Jackson in the night, with southerly or westerly winds, should keep the sea until daylight; but with winds from the northward or eastward, and favourable weather, they may safely enter.

Botany bay, as already described at page 463, lies about 10 miles to the southward,* and Broken bay lies 16 miles to the northward† of Port Jackson; and it is of the utmost consequence that such vessels as may happen to be in bad condition, and unable to keep off shore, should be aware of these useful places of refuge.

To ENTER PORT JACKSON from the SOUTHWARD.—When coming from the southward, if the weather be dark or thick, preserve a good offing until the Sydney heads or the Outer South Head light be seen, in order to clear the projection of the coast about Botany bay, where it is comparatively low, and where the current sometimes sets S.W., towards the shore.

* See Plan of Botany bay and Port Hacking, No. 2,179; scale, $m = 2$ inches; also Australia Directory, Vol. I. page 463.

† See Plan of Broken bay, No. 2,166; scale, $m = 2$ inches.

Having clearly made out the Sydney heads, and being abreast of the Outer South head, if the wind be fair, steer to the north-westward, taking care not to bring the Outer South Head light-house to the westward of Gap bluff, in order to clear the South reef; but, as the sea generally breaks upon it, it may easily be seen, and with a commanding breeze, may be passed in 8 fathoms, at a cable's length off. Soon after opening Middle head, to the northward of Inner South head, with the latter bearing S.W., pick up the leading mark A, by getting the two *white* obelisks on the western shore in line, bearing W. $\frac{1}{2}$ S., which will clear the South reef and the 16-foot patch on the northern edge of the Bar and Flats.

West Channel.—Steer in upon the leading mark A, until Elizabeth house—an imposing white square building, with a dome—closes Bradley point, bearing S.W. by S.; this will be the leading mark C, to which the course must now be altered, carefully keeping Elizabeth house just closed over the low part of Bradley point, and this will lead through West channel, clear of the Sow and Pigs shoals, passing at about two-thirds of a cable's length to the westward of the light-vessel. The soundings, when passing the 16-foot patch on the northern edge of the Bar and Flats, will decrease from 7 to $5\frac{1}{2}$, and then to $3\frac{1}{2}$ fathoms, which will be the depth until through West channel, when the water will quickly deepen to 10 fathoms, as the Outer South Head light-house opens its breadth to the southward of the *red* and *white* chequered obelisk below it (mark E), bearing S.E. by E. $\frac{1}{2}$ E.

The Bar and Flats being now cleared, steer S.S.W., passing between Bradley point and Shark island; round the point at the distance of about a quarter of a mile, to clear the spit running out from it, and then proceed westward for Sydney.

In beating through West channel, the deepest water will be found on the western shore, with the exception of the 18-foot shoal extending north-eastward from George head, already mentioned. Avoiding this shoal, the western shore may be made free with to the distance of half a cable's length; but in standing over to the eastern side, northward of the light-vessel, the 16-foot patch on the northern edge of the Bar and Flats must be cautiously avoided, by not allowing the light-vessel to bear to the westward of S. by W. $\frac{3}{4}$ W.

Abreast of George head, West channel is contracted to little more than $1\frac{1}{2}$ cables' width by the 18-foot ridge forming the south-west extreme of the Sow and Pigs shoals; to clear this, the obelisk on the south slope of the North head promontory must be kept a little open to the westward of the light-vessel, until the Outer South Head light-house is open at least its own breadth to the southward of the *chequered* obelisk below it, when the Bar and Flats will have been passed.

Vessels of heavy burthen, or drawing more than 18 feet, ought not with a fresh wind, to attempt to work through either of the narrow channels across the Bar and Flats; but vessels of lighter draught than 15 feet, can stretch right across from shore to shore, North of the light-vessel, passing over the 16-feet patch, on the northern edge of the Bar and Flats, and that portion of the Sow and Pigs shoals lying to the southward of a line from George head to the obelisk on Green point, which bear nearly East and West from each other, remembering that the deepest water over the Bar and Flats is between the leading marks C and D,—Elizabeth house in one with Bradley point; and Craigend mill shutting in with the point.

A vessel of war, if bound for Man-of-war road, should, when abreast of Garden island, haul up between it and Fort Denison, if proceeding to Garden Island anchorage, when she may come to in 7 fathoms, with Inner South Head light-house in line with the north extreme of the island.

For Farm cove, haul in between Fort Denison and Lady Macquarie point, taking care not to close the Outer South Head light-house with the north bluff of Garden island, and anchor, in 6 fathoms, between Fort Macquarie and Lady Macquarie point.

In proceeding to the Government dock at Cockatoo island, it is only necessary to keep in mid-channel, until off Balls head—about a mile above Sydney cove—where attention is called to a 19-feet patch, half a cable's length in diameter, lying in mid-channel between Balls head and Longnose point; to clear which to the southward, Dawes battery flag-staff should be kept a little open of the water-police station, at the north extreme of Goat island, taking care, after passing the patch, to avoid Longnose point by keeping Blues point just shut in by Balls head. Then, after clearing Longnose point, steer for Cockatoo island, at the south-east elbow of which is Fitzroy dry dock, denoted by the steam-engine chimney.

East Channel.—A vessel from the southward, able to lay a S. $\frac{1}{2}$ E. course, should pick up leading mark A, as already directed, and, proceeding on this mark, look out upon the port beam for the Eastern obelisks, on Green and Vacluse points; as these obelisks come in line—leading mark B—haul up for them S. $\frac{1}{4}$ E., carefully preserving their line for the first quarter of a mile, when the locking of the Outer North, and the Inner South heads will indicate being through the narrows. The vessel may now be edged off nearly a point from the leading mark, and when drawing in abreast of Camp cove, between Inner South head and Green point, steer S. by W.; taking care not to open the sea-mark obelisk on the south slope of the North head promontory after once closing it with the Inner South head, until St. James church spire is its breadth open to the southward of Bradley point—leading mark F—bearing S.W. $\frac{1}{2}$ W.,

which will lead clear of the south-east extreme of the Sow and Pigs shoals.

By Night from the Southward.—A vessel from the southward being abreast of, or at about three-quarters of a mile to the eastward of the Outer South Head revolving light, with the Inner South Head fixed light well open of the Gap bluff, bearing N.W., should steer N.W. by N. until the Inner South Head light bears S.W., by which time the floating light should be well open upon the bearing S.W. by W. $\frac{1}{4}$ W.; then steer West, which will clear the South reef and the 16-feet patch on the northern edge of the Bar and Flats, rounding the breakers on the former, at the distance of a cable's length, in 9 fathoms. When the floating light bears S.S.W. steer S.W. by S., passing at about a cable's length to the westward of the light-vessel; continue this course until the Outer South Head light bears E.S.E., when the Bar and Flats will have been passed, and the vessel may anchor in 9 fathoms, with the Outer South Head light bearing E.S.E. and the floating lights N. by E.

Or, in fine weather, by keeping a sharp look-out, a vessel may proceed to abreast of Sydney, first steering S.S.W. until the Outer South Head light bears nearly E. by N. $\frac{1}{2}$ N., and the *red* light on Fort Denison West; then steer West for the *red* light, which may be passed on either side, at the distance of a cable's length, and by bringing it astern in line with the Outer South Head light, bearing E. by N., the vessel will clear Fort Macquarie spit, and may anchor in Sydney cove, in 7 fathoms, mud.

A vessel of war going to any part of Man-of-war road, should, from abreast of Bradley point, steer westward towards Fort Denison light, and, when north of Garden island, haul in to the southward, between it and the fort, if bound for Garden island anchorage, which will be entered as soon as the Outer South Head light is shut in by the northern bluff of the island, bearing E. by N. $\frac{1}{2}$ N.

If bound for Farm cove, and any vessel which might be lying there can be discerned, proceed to the westward, between Fort Denison and Lady Macquarie point, taking care in passing that point, not to close the Outer South Head light with Garden island bluff; a good berth may then be picked up, in 8 fathoms, mud, with Fort Macquarie bearing about West, and Fort Denison N.E.

From the EASTWARD.—A vessel proceeding for Port Jackson from the eastward, will find the latitude ($33^{\circ} 50'$ S.) the best guide for making the port. When the heads are clearly distinguished, bring Middle head, which faces the entrance, to bear West, and steer for it upon that bearing, until the Western obelisks, immediately to the south-westward of Middle head, are made out; then get them in line, bearing W. $\frac{1}{2}$ S., and having thus picked up leading mark A, and cleared the South reef, haul up for

crossing the Bar and Flats by West or East channel, as most convenient, and proceed as directed when entering from the southward, at page 488.

At Night, as in the daytime, the latitude must be in great measure depended upon for making Port Jackson from the eastward, until the Outer South Head revolving light, and afterwards the Inner South Head fixed light are distinguished. When the Inner South Head light first becomes visible, it appears dipping at the distance of about 10 miles from the land, the soundings being 70 fathoms, dark sand, and when at about 5 miles off, the depth will be 50 fathoms, fine sand.*

When the Inner South Head light is distinctly visible, steer for it upon a West bearing, until the Outer South Head light bears about S.S.W.; then alter course to W. by N., so as to make sure of clearing the dangerous South reef; and when the Inner South Head light bears S.W., distant about a quarter of a mile, and the light-vessel is well open, bearing S.W. by W. $\frac{1}{4}$ W., steer West again, round the breakers on South reef at the distance of a cable's length, in about 9 fathoms water, and when the floating light bears S.S.W. steer S.W. by S., through West channel, passing at about a cable's length on the west side of the light-vessel. When the Outer South Head light bears E.S.E. the Bar and Flats will have been passed, and the vessel may anchor or proceed up the harbour, as directed at page 490.

* If, when running in upon a westerly bearing of the Inner South Head light, the land be too indistinct for cross bearings, the vessel's approximate position may be readily ascertained by a sextant angle, between the Inner and Outer South Head lights, the corresponding distance being found in the following table :—

Bearing of Inner South Head light.	Angle between Inner, and Outer South Head lights.	Distance from Inner South Head light.	Distance from Outer South Head light.
W. by S.	° /		
	15.15	5 miles.	5 miles.
	18.45	4 "	4 "
	24.30	3 "	3 "
	35.00	2 "	2 "
	57.45	1 "	1 $\frac{1}{4}$ "
West.	15.00	5 "	4 $\frac{3}{4}$ "
	18.45	4 "	3 $\frac{3}{4}$ "
	25.15	3 "	2 $\frac{3}{4}$ "
	37.00	2 "	2 "
	65.00	1 "	1 $\frac{1}{4}$ "
W. by N.	14.00	5 "	4 $\frac{1}{4}$ "
	18.00	4 "	3 $\frac{1}{4}$ "
	24.45	3 "	2 $\frac{1}{4}$ "
	39.00	2 "	1 $\frac{3}{4}$ "
	73.00	1 "	1 "

From the NORTHWARD.—No especial directions are required for vessels proceeding into Port Jackson from the northward in the daytime, as those already given for entering from the eastward, at page 490, will answer every purpose, taking care to give the North head a good berth, especially with a light wind and a ground swell.

At Night from the Northward.—A vessel from the northward entering Port Jackson by night, has merely to keep the Outer South Head light to the westward of S.S.W. $\frac{1}{2}$ W., to give her a half mile clearance to the North head, and looking out for the entrance, the quickly successive opening of the Inner South Head light, bearing S.W. $\frac{1}{4}$ W., and the floating light S.W. $\frac{3}{4}$ W. will indicate the vessel being nearly a mile to the eastward of the North Head promontory ; and it is rarely so dark but that the black, towering North head will show when to steer W. by S. $\frac{1}{2}$ S., for the entrance between the heads, which should be done just as the floating light comes on with the Inner South head, bearing S.W. by W. $\frac{3}{4}$ W., remembering that the North head will be cleared as long as the floating light is not opened to the northward of the Inner South head. Continue a W. by S. $\frac{1}{2}$ S. course, in not less than 9 fathoms, as the South reef and the northern edge of the Bar and Flats are being passed, until the floating light bears S. by W. $\frac{3}{4}$ W. then steer S.W. by S., through West channel, passing at about a cable's length to the westward of the light-vessel. When the Outer South Head light bears E.S.E., the vessel may anchor, or proceed up the harbour, as directed at page 490.

WORKING into PORT JACKSON.—A westerly wind, although a leading wind across the Bar and Flats and up Port Jackson, as far as Bradley point, blows right out of the entrance ; but there is ample working room, for a well-handled vessel, between the heads, the shortest board being half a mile, between the South reef and the Inner North head ; and, should it be ebb stream, it may be evaded by always tacking to the southward directly the light-vessel opens to the northward of the Inner South head, until having worked up as close to the South reef as brings the signal tower on the Outer South head to touch Gap bluff, bearing S. by E. $\frac{3}{4}$ E., upon which line the vessel may stretch to the northward, clearing the South reef at a cable's length, and then haul close up, on the port tack directly the light-vessel opens to the south-westward. Here the ebb stream will catch the vessel on the weather quarter ; but as she reaches across towards the North harbour its strength, of $1\frac{1}{2}$ knots, will be avoided.

It should be here stated that immediately outside the Bar and Flats, the ebb stream sets to the north-eastward, towards the Inner North head, and then E.S.E., along shore, towards the Outer North head, leaving the space

from the line of the Outer heads to the Inner South head, in slack water during the ebb.

CAUTION.—To ensure success in beating in, and to avoid mishap, smart working, and readiness with both anchors will be absolutely necessary to cope with flaws and gusts of wind, as well as the ground swell, which perplex even those who frequent Port Jackson.

TIDES.—It is high water, full and change, between Sydney heads, at 8h. 15m., and at Garden island at 8h. 30m.; the rise at ordinary springs being 5 feet, and at neaps 4 feet.

In the offing, within the line of the currents, the ebb sets to the southward and the flood to the northward. Outside the Bar and Flats, as just stated, the ebb sets across the Sound, towards the Inner South head, and then about E.S.E. close along shore in the direction of the Outer North head, leaving all the space between the line of the Outer heads and the Inner South head in slack water, as regards the ebb stream. The ebb and flood streams set fairly across the Bar and Flats, N.E. and S.W., and up the harbour, partake of the mid-channel trends; the ebb from Shark island to the Bar and Flats setting N.E. and the flood S.W.; and above Bradley point the ebb stream East, and the flood West; the maximum rate of the ebb being 2, and of the flood $1\frac{1}{2}$ knots.

CHAPTER IX.

WINDS AND CURRENTS.—DIRECTIONS FOR THE ROUTES BETWEEN
CAPE LEEUWIN AND SYDNEY : ALSO FROM AUSTRALIA TO
CAPE OF GOOD HOPE, AND TO CAPE HORN.

THE general remarks and directions in the Introduction to this volume having pointed out the most desirable route from the Cape of Good Hope to Cape Leeuwin, the description, in this chapter, of the winds and currents on the southern coasts of Australia will be followed in consecutive order, by Sailing Directions, eastward and westward, between Cape Leeuwin and Sydney, with brief directions for the routes recommended from Australia westward, to Mauritius and the Cape of Good Hope, and eastward, to cape Horn.

WINDS near CAPE LEEUWIN and to BASS STRAIT.—Near Cape Leeuwin the wind blows generally from the westward, varying in summer from N.W. in the night, to S.W. in the latter part of the day, though not with regularity. Both here and off the south coast of Australia, as far as Bass strait, the strongest and most durable winds blow from the south-westward, causing a long and incessant swell, from April to November, when the weather is generally very unsettled and tempestuous, and gales at S.W. are frequent, varying sometimes between S. by W. and N. by E.

Captain Flinders remarks :—"The progress of the gales is usually this : the barometer falls to $29\frac{1}{2}$ inches, or lower, and the wind rises from the north-westward, with thick weather, commonly with rain ; it then veers gradually to the westward, increasing in strength, and generally clearing up as soon as it obtains any southing. At S.W. the gale blows hardest, and the barometer rises ; and by the time it reaches South or S.S.E. it becomes moderate, with fine weather, and the barometer above 30 inches. Sometimes the wind may back round to West, or something to the northward, with a fall in the mercury, and with diminishing strength, or perhaps die away ; but the gale is not over, although a cessation of a day or two may take place. In some cases the wind flies round suddenly from N.W. to S.W., and the rainy thick weather then continues a longer time."

"Such is the usual course of the gales along the South coast, and in Bass strait ; but on the east side of the strait, the winds partake of the nature of those on the East coast, where the gale often blows hardest

between South and S.E., and is accompanied with thick weather, and frequently with heavy rain.”*

WINDS on the SOUTH COAST.—In the Great Australian bight, between the archipelago of the Recherche and cape Northumberland, from the middle of January to the middle of April, the prevailing winds are moderate between S.E. and E.N.E., partaking of the nature of sea and land breezes, and attended with fine weather; but westerly winds and south-west gales have occasionally been experienced in this space during the above period, though the latter are said seldom to blow home on the coast. In the summer, the wind generally revolves with the sun; a change to the southward being at all seasons preceded by a rise in the barometer, and winds from the opposite quarter being foretold by its fall.

The Barometer is always of great service on the southern coast of Australia, warning the navigator to get an offing when it falls with unusual rapidity, and thick weather accompanies an increasing breeze from the south-westward, as a south-west gale may then be expected, and often comes on without much previous notice. The medium height is about 30 inches for fine weather or steady wind, and it seldom falls below $29\frac{1}{4}$ inches.

The WINDS and WEATHER in BASS STRAIT are very similar to those which are met with along the whole of the South coast of Australia, except towards its eastern part, where they partake of the nature of those on the East coast, and the strongest gales blow frequently from the S.E. Captain Flinders, who had much experience on the shores of this country, very justly remarks:—“Everything in Bass strait bespeaks the strongest winds to come from the S.W., and there is reason to believe that during nine months of the year, it generally blows from some point in the western quarter. In January, February, and March, easterly winds with fine weather, seem to be not uncommon, but there is no dependence to be placed on them at any other season. At the eastern side of the strait and of Tasmania, it is not unusual to meet a north-east or north wind, though it seldom blows strong. The gales usually come from between S.W. and S.E., and most frequently from the latter direction, which renders it hazardous to approach the coast between Cape Howe and Wilson promontory.”

Captain Stokes says, that January and February are the best months for making a passage to the westward through Bass strait, although easterly winds blow on some rare occasions at other times; but these are mostly gales, and generally terminate in a breeze from the opposite quarter, having

* Flinders' *Terra Australis*, vol. i., p. 244.

much the character of a rotary gale. The gales that chiefly prevail in the strait begin at N.N.W., and gradually draw round by West, to S.W., at which point they subside; if, however, the wind, before it has so much southing, veer again to the northward of West, or backs, the gale will continue; but its duration may be told by the barometer, as it is seldom fine when it registers less than 29.95, and bad weather is certain if it falls to 29.70.*

The direction of the wind in Bass strait, must not always be considered as the criterion by which to judge of its direction and strength to the eastward of the islands, between Wilson promontory and north-east part of Tasmania, where it is frequently found to blow from nearly the opposite quarter, and is usually very variable. Thick weather accompanying a breeze from the south-eastward, especially in the winter months, from May to September, is generally the precursor of a gale, and should be regarded accordingly.

WINDS and WEATHER on the WEST COAST of TASMANIA.—The prevailing winds are from S.W., and bring much bad weather, especially in the winter months of June, July, and August. An experienced resident in that country has observed:—"Whenever the wind veers round to the S.E., or is easterly, it is a certain intimation of fine weather; but whenever the wind shifts against the sun, bad weather is sure to follow. Mariners sailing along the coast will, therefore, do well to pay attention to the state of the wind, which affords almost infallible prognostics of good or bad weather." †

Barometer.—The same laws, with perhaps few exceptions, govern the natural phenomena both off the South coast of Australia and off the West coast of Tasmania. The following extract from a journal kept by an officer of H.M.S. *Bathurst*, ‡ on her passage from the South coast of Tasmania to King George sound, in October and November 1822, may prove useful in showing the nature of the winds and weather which may be expected to the westward of Tasmania at this season of the year, and the reliance which may be placed on the marine barometer, for its indication of any changes:—"At sunset, 8th of October, passed the Mewstone, with a fine breeze from the north-eastward, and steered West; but before midnight the barometer had fallen from $29\frac{3}{4}$ to $29\frac{1}{2}$ inches, the wind became light, and was afterwards squally, with heavy threatening weather. Before dawn, on the 9th, the sloop was under close-reefed topsails, the wind having chopped round

* Stokes' *Australia*, vol. ii. p. 495.

† Mr. G. W. Evans, Surveyor-General at Van Diemen's Land, in his *Geographical Historical, and Topographical Description of it*, p. 51.

‡ *Journal of Lieut. J. S. Roe, R.N.*, now Surveyor-General of Western Australia.

in sudden squalls from N.E. to the N.W., in which quarter it remained for three days, blowing strong and squally, with the barometer below $29\frac{1}{2}$ inches.

“On the 11th, it fell to 29·33, and the wind inclined westerly and S.W. On the morning of the 13th the mercury attained an elevation above $29\frac{1}{2}$ inches again, and continued to rise, while the wind veered round to the S.W. and southward, attended with thick cloudy weather, frequent squalls, and rain; in the evening it was at 30 inches, with a fresh breeze from the S.S.E. In less than 24 hours the wind had veered round by East (in its usual way) to North, and the mercury, which had reached the height of 30·15 inches, then began gradually to descend. At noon on the 16th, being in lat. $40\frac{1}{2}^{\circ}$ S., long. $134\frac{1}{2}^{\circ}$ E., it had fallen nearly to $29\frac{1}{4}$, and we had another fresh breeze from W.N.W.; in which quarter, and from the S.W., it prevailed in nearly the same way till towards the latter end of the month, when we had some moderate weather, and the barometer maintained an average height of about 30 inches.

“A more northerly route was then attempted, but the same series of hard gales from W.N.W., and heavy squalls again obstructed our progress. On the morning of November 1st, the barometer was at 29·90, and in 12 hours fell a quarter of an inch, when the wind had shifted from W.S.W., and blew a gale at N.W.; in less than 12 hours afterwards it had fallen to 29·35, and we were under reefed storm-staysails, with a hard gale between W. by N. and W. by S., accompanied by severe squalls; but in an equal space of time, the mercury rose with rapidity, half an inch, the gale veered southerly, moderated, and was succeeded by light winds from the S.W. and N.W. for two days, with the barometer at 30 inches. The sloop was then about 100 leagues to the E.S.E. of King George sound, and made Termination island, the southernmost of the Recherche archipelago, on the 6th, with moderate south-west winds, and barometer above $30\frac{1}{4}$ inches. An easterly breeze, by which these were succeeded, having veered round to the S.W., contrary to its usual routine, the barometer fell to $29\frac{3}{4}$, and we had another gale from the westward, which retarded our arrival in King George sound till the night of the 10th of November, after a tedious and boisterous passage of 46 days from Port Jackson.”

WINDS and WEATHER on the EAST COAST of AUSTRALIA.
—The prevailing winds between Cape Howe and Port Jackson are from the N.E. in summer, and from the westward in winter. But there are occasional gales from S.W. as well as strong breezes from between North and E.N.E., bringing rain with thunder and lightning; these, however, are usually of short duration. Very oppressive hot winds from N.W. sometimes blow fiercely in the summer, and are invariably followed by a sudden shift from between S.E. and S.S.W., against which vessels near

the coast, should be particularly guarded, as the first gust is generally very violent, and apt to occasion damage, unless due precautions have been taken. The effect of these sudden changes is so great, that Captain Flinders says he has seen the thermometer at Port Jackson descend from 100° to 64° in less than half an hour.

Besides the sudden changes from N.W. to southward, a change from N.E. to South is very frequent in the summer, and generally happens after some days of north-east winds. These changes, as a rule, may be foreseen by clouds rising in the South, with lightning. Sometimes, however, very little warning is given, as the shift of wind may happen with a cloudless sky.

Although southerly winds are more frequent in the winter months than in summer, they occasionally blow three or four successive days in the summer: the southerly wind is inclined to draw off the land at night, from a S.W. or even a W.S.W. direction, especially during the winter months, and is always felt to have more westing in it the nearer a vessel approaches the land.

In the winter season, from May to September, the cold western winds are most prevalent, and are generally accompanied with fine weather and a dry atmosphere; the gales come from the eastward between N.E. and South, and bring rain with them; indeed, there is no settled weather in the winter with any winds from the sea, and even with north-west and north winds, there is frequent rain, though they are usually light when in that quarter.

Land and sea breezes are not frequent, but are met with occasionally, during the spring and autumn months: in the height of summer the north-east wind springs up from a calm early in the forenoon, and subsides at about midnight; a slight draught off the land being occasionally felt close inshore between these intervals.

Easterly gales are not very frequent; but from the scarcity of harbours on this coast, they are much dreaded by coasters: the worst of these gales is their being generally unsteady in direction, veering from E.N.E. to E.S.E. in squalls. A well-appointed ship, however, if not embayed, may generally maintain an offing by keeping on the starboard tack, thereby having on her lee bow the current, which almost always sets to the southward.

Mr. John Ross, harbour master at Moruya river says,—“The gales of wind that have occurred during the last year, to which my attention has been particularly directed, have been marked by the rotary character so well known to prevail in the South Pacific and Indian oceans. They commence at North or north-eastward; the mercury falls, the wind freshens, and veers to the N.W.; the mercury begins to rise, the wind

becomes South, then S.E., when, after a six hours' blow—seldom more than 12 hours—the breeze is over, and is generally succeeded by some days of fine weather, with a high barometer. With the south-east portion of the gale, the sea comes in on the East coast, and there is the highest sea on this bar. In fine weather, after the gale has passed, a strong southerly wind sometimes blows for a few following days, dropping about sunset and freshening again after sunrise : this is always the forerunner of fine weather for some time."

The Barometer will be of singular advantage ; for if the weather be tolerably fine, and the mercury do not stand above 30 inches, there is no probability of danger ; but when the mercury much exceeds this elevation and begins to descend, and the weather is becoming thick, a gale from S.E. to East is to be apprehended, and a vessel should immediately obtain a proper offing. With respect to the rise and fall of the barometer, it may be taken as a general rule upon this East coast, that a rise denotes either a fresher wind in the quarter where it then may be, or that it will veer more to seaward ; and a fall denotes less wind, or a breeze more off the land ; moreover, the mercury rises highest with a south-east, and falls lowest with a north-west wind, and N.E. and S.W. are the points of mean elevation.*

CURRENTS ON THE SOUTH COAST OF AUSTRALIA.—Near Cape Leeuwin, and off the South coast of Australia, the current at all times of

The following information on the current in the neighbourhood of Cape Leeuwin and Swan river during the summer months (January and February), is extracted from the Remark Book of Captain Charles W. Hope, of H.M.S. Brisk, 1868 :—

"After rounding Cape Leeuwin a strong set to the E.N.E. was experienced. At 8 p.m., abreast of Cape Naturaliste, 15 miles distant, a course was steered to pass 8 miles to the westward of Rottnest island ; but at daylight Garden island was observed on starboard bow and Rottnest island on the port bow, the ship having been set 20 miles to the E.N.E. during the night. Had the weather been thick, so that the land or Rottnest light could not be distinguished, the ship would have been in a very dangerous position, as the course steered would have led directly on to the reefs north of Garden island."

Also, from the same source, the following notice of reported shoal water, 16 or 18 leagues westward of Swan river :—

"A bank with 20 fathoms water on it, has been discovered some 50 miles to the westward of Rottnest island, and breakers were said to have been seen in 1864 from the *Beaver*, merchant vessel, W. by S. 52 miles from Cape Vlaming, the west extreme of Rottnest island."

meeting another flood, coming from the southward along the West coast of Tasmania, overruns this easterly current, the influence of which is not again felt till on the meridian of Cape Howe, where it is experienced running at the rate of one knot to the eastward, and dissipating itself in the waters of the Pacific.

By this it will appear, that off the South coast, a current generally will be found running to the north-eastward, inclining easterly, particularly after, or during the prevalence of the strong westerly winds, which blow during nine months of the year in this region, and which throw a great body of water upon the western shores of Tasmania. During summer when these winds are only occasionally experienced on the South coast, and strong southerly gales detach large masses of ice from the frozen Antarctic regions, and drive them as far North as 46° and 45° S., the easterly current abates in strength, and after a fresh easterly wind, it is not unfrequently found to change its direction to the N.W.

CURRENTS and TIDE STREAMS in BASS STRAIT.—Such an accumulation of water as is forced through Bass strait, by the prevalence of westerly winds off the South coast of Australia, would naturally lead to the expectation of finding a strong current in the strait setting to the East ; but on the contrary, the set in common cases, was found to be rather in the opposite direction, the current appearing to be predominated by the tides, the superior strength of which forced it below the surface.

The flood stream comes from the eastward, and after attaining high water at the Furneaux islands, passes on to Hunter and King islands, where it meets another flood stream from the southward, and the high water then made, seems to be nearly at the time that it is low water at the Furneaux group. Another flood is then coming from the East, and so on ; whence a ship going eastward through the strait, will have more tide stream meeting, than setting after her, and be commonly astern of her reckoning. This applies more especially to the middle of the strait, and is what Captain Flinders there found with winds blowing across it ; but the bight on the north side, between cape Otway and Wilson promontory, seems to be an exception, and, in fact, lies out of the direct set of the tide streams. In running from Port Phillip to the promontory, H.M.S. *Investigator* was set E. $\frac{1}{4}$ S. 35 miles in the day ; but it then blew a gale from the West and S.W.

Although the easterly current be not commonly found at the surface in Bass strait, it is not lost. Navigators find it running with considerable strength, when passing the strait at two or three degrees to the eastward of Furneaux islands ; and it was this current so found, which led Admiral Hunter to the first opinion of the existence of an opening between New South Wales and Tasmania.

CURRENTS on NORTH and WEST COASTS of TASMANIA.—The flood stream runs to the westward along the North coast of Tasmania ; but near the coast, between Circular head and cape Portland, there is almost a constant current running to the eastward during the greater part of the year.

The flood stream runs to the northward along the West coast of Tasmania ; and there is also a current generally setting in the same direction, particularly during the prevalence of south-west and southerly winds, which throw a great body of water upon this shore from the Great Southern ocean.

CURRENTS on the EAST COAST of AUSTRALIA.—It is a remarkable fact that while the prevailing winds on the East coast of Australia are from S.E. in summer and S.W. in winter, the current almost constantly sets to the southward along this part of the coast, in a broad serpentine belt, extending 20 to 60 miles from the land, at a rate varying from half a knot to 3 knots, the greatest strength being near the most projecting points. Beyond the above limits, there seems to be no constancy in its direction ; and close in with the shore, especially in the bights, there is very commonly an eddy, setting to the northward, from a quarter of a knot to 1 knot. It is along the southern part of this coast that the current runs the strongest ; and towards Cape Howe, it takes a direction to the eastward of South, whereas in other places it usually follows the line of the shore.

Captain Stokes says, that during mid-winter months, in easterly and southerly gales, a current of 1 to $2\frac{1}{4}$ knots to the southward, was felt in H.M.S. *Beagle*, at 40 to 90 miles from the coast, between Jervis bay and Port Stephens ; and H.M.S. *Rainbow*, in her passage from Tasmania to Port Jackson, in February 1827, experienced an easterly current, which set her 36 miles in 24 hours.

Mr. John Ross, harbour master, of Moruya river, says :—" The southerly current prevails a few miles from the coast ; but close inshore there is often a strong northerly set, frequently $1\frac{1}{2}$ knots, which might be taken advantage of by small vessels bound to the northward."

DIRECTIONS.

For SPENCER GULF and PORT ADELAIDE from the WESTWARD.—A vessel from the Indian ocean having proceeded eastward on the parallel of 38° S. until on the meridian of 115° E., as recommended in the Introduction, and bound for Spencer gulf or Port Adelaide, should, from this position, run about 1000 miles on a N. 82° E. *true* course for cape Borda, the west end of Kangaroo island, the light on which may, in clear weather, be seen at the distance of 30 miles. Having sighted cape Borda or the Neptune isles, enter Spencer Gulf as directed at page 111 ; or if

bound through Investigator strait for Port Adelaide, proceed as directed at page 134.*

For PORT ADELAIDE by BACKSTAIRS PASSAGE.—Vessels from the westward, intending to enter the gulf of St. Vincent by Backstairs passage, (between the east end of Kangaroo island and cape Jervis,) should avoid the neighbourhood of Mitchie reef, which has been stated to exist about S. by W. $\frac{3}{4}$ W. 30 miles from cape Couëdie, the south-west point of Kangaroo island. Young rocks, lying S.E. by E. $\frac{3}{4}$ E. 32 miles from the same cape, are not so dangerous, as one of them is 30 feet high. Deeply laden vessels and small craft must however be prepared, after south-west gales, for heavy breaking seas 10 or 12 miles southward of cape Willoughby, the east point of the island. These breakers will be cleared to the eastward, by keeping Sturt light, on cape Willoughby, to the westward of N.N.W., when proceed through Backstairs passage as directed at page 143.

ROUTE to PORT PHILLIP and to SYDNEY through BASS STRAIT.—When bound from the westward to Port Phillip or to Sydney, and if Bass strait be preferred to the more boisterous and circuitous route round Tasmania, it is advisable on reaching a position about 200 miles southward of Cape Leeuwin, to steer on the parallel of King island, to prevent being thrown into the bight to the westward of cape Northumberland by a probable south-east wind, or being driven to the southward by strong winds from the northward or N.N.E., both of which are often experienced between 40° and 44° S., to the westward of Tasmania.

The winds and currents described in the beginning of this chapter, must be carefully attended to when sailing eastward for Bass strait, particularly during the prevalence of south-west or southerly gales, as these gales are of frequent occurrence, and calculated to cause a commander considerable anxiety when on the coast to the westward of cape Otway, which is so destitute of places of shelter from such gales, and is so exposed to the fury of the boisterous Southern ocean. During a continuance of these gales, a vessel should not go to the northward of the parallel of 40° S., after passing the meridian of 135° E., until King island is approached within about 120 miles. The coast to the westward of cape Otway should also be avoided by vessels going eastward, on account of south-easterly or easterly winds, which are often experienced here for several days together, especially in the summer, blowing along the coast, and causing a lee cur-

* See Charts and Plans : Australia, General Chart, Southern Portion, Sheet 2, No. 2,759 b; scale, $d=1$ inch; South Coast, Sheet 3, No. 1,061; scale, $m=0.08$ of an inch; Gulfs of St. Vincent and Spencer, No. 2,389; scale, $m=0.13$ of an inch; Trounbridge shoals, No. 2,152; scale, $m=2$ inches; Port Adelaide and Holdfast bay, No. 1,752; scale $m=\left\{\begin{smallmatrix} 0.5 \\ 1.5 \end{smallmatrix}\right\}$ inches : also Chapter II. ; Winds, page 494, and Currents, page 499. For local directions in Gulfs of St. Vincent and Spencer, refer to the Index.

rent. Vessels making the land about cape Otway during the continuance of strong westerly winds, should be prepared for a southerly set; H.M.S. *Challenger* in 1866, having been set to the southward 30 miles in 24 hours.*

For PORT PHILLIP.—A vessel bound to Port Phillip from the westward, having arrived in the West entrance of Bass strait, and clearly distinguished cape Otway, may proceed north-eastward for Port Phillip, for approaching and entering which, full directions will be found at page 243.†

BASS STRAIT.—When the position of a vessel proceeding through Bass strait from the westward is ascertained, between cape Otway and King island, an easterly course should be shaped for Curtis isle, which, in clear weather, is visible at the distance of 30 miles from a ship's deck; and as it is 135 miles from the entrance between cape Otway and King island, and no known danger lies in the intermediate space, a vessel may, with a good look-out, run part of the distance in the night. When Curtis isle is distinctly seen, keep it a little on the port bow, so as to pass on the South side of Sugarloaf rock, from whence steer N.E. by E., passing to the northward of the Kent group, and leaving the Devil's tower and Hogan group on the port hand. Or, from the Sugarloaf steer E. $\frac{3}{4}$ N., to pass 2 or 3 miles southward of Kent group, leaving Judgment rocks on the port, and Wright rock on the starboard hand.‡

BASS STRAIT to SYDNEY.—Having passed Kent group, a N.E. by E. course will lead about 60 miles seaward of Cape Howe; but should it blow hard from the southward, a more easterly course should be steered, to avoid what would then be the dangerous lee shore, known as the Long beach, which extends from Corner Inlet for 150 miles, or nearly to Cape Howe. From a known position eastward of Cape Howe, steer northward along the East coast for Port Jackson, at such distance from the land as the wind and other circumstances would suggest, bearing in mind that the current generally sets to the southward along the East coast at a distance of 20 to 60 miles from the land. After having made the light on the South head of Port Jackson, enter the port as directed at page 486.§

* See Chart of Australia, South coast, Sheet 4, No. 1,062; scale, $m = 0.08$ of an inch; also Chapter III.; and for ports of refuge between Cape Leeuwin and Bass strait, see page 202.

† See Charts of Bass strait, Nos. 1,695 and 1695a; scale, $m = 0.2$ of an inch; also Chapters IV. and V.; Winds, page 495, and Currents, page 500.

‡ For Anchorages in Bass strait when going eastward, see page 307.

§ See Charts of Australia, East Coast, Sheet 1, Cape Howe to Barriga point, No. 2,141; Sheet 2, Barriga point to Jervis bay, No. 2,142; and Sheet 3, Jervis bay to Broken bay, No. 2,143; scale, $m = 0.26$ of an inch: also Chapter VIII.; Winds, page 495, and Currents, page 501.

SOUTH-WESTERN ENTRANCE of BASS STRAIT.—The entrance into Bass strait between King island and the Hunter group is not recommended, on account of Reid rocks and Bell reef, which lie in this entrance. But should a vessel from necessity or choice, enter Bass strait by this passage, she should keep to the southward of Reid rocks and Bell reef, the latter being cleared at the distance of $2\frac{1}{2}$ miles southward of it, by steering for Black Pyramid on an East bearing. Or, with a commanding breeze, she may pass between King island and Reid rocks, without danger, by keeping well over on the northern side, and paying attention to the tide stream, which sets across the channel. From the Black Pyramid steer N.E. by E. and pass about 1 mile northward of Albatross islet, from whence a vessel bound to Port Dalrymple or Launceston, may steer about E. $\frac{1}{2}$ N., to round Mermaid rock, off the north extreme of Three Hummock island, then shape an E. by S. $\frac{1}{2}$ S. course for Port Dalrymple, and proceed as directed at page 320. A vessel bound north-eastward through Bass strait from Albatross islet, may continue N.E. by E. for Kent group.*

For HOBART TOWN and SYDNEY by the ROUTE SOUTH of TASMANIA.—If bound for Hobart Town, or if the southern route be preferred for proceeding to Sydney, a ship running down her longitude through the Indian ocean on the parallel of 38° or 39° S. as recommended in the introductory remarks of this work, and having passed the meridian of 115° E., should, on reaching the meridian of 145° E., be far enough South to round Tasmania before making the land, in order to avoid falling in with its rocky western coast in the night, from any error in the reckoning, or from being caught on a lee shore by a south-west gale.

For HOBART TOWN.—A vessel having arrived at about 10 miles southward of the South-west cape of Tasmania, may proceed E. by N. between Maatsuykers islets and the Mewstone, where there is a clear channel 5 miles wide. From thence 25 miles continued on an E. by N. course, will bring a vessel to about 3 miles southward of South cape, and if bound through D'Entrecasteaux channel to Hobart Town, she may proceed as directed at page 386, or, if the far better route through Storm bay be taken, give a good berth to the Friar rocks, off Tasman head, and follow the directions given at page 393.†

When blowing heavily from the S.W. or southward, especially if unable

* See Charts of Bass Strait, Nos. 1,695 and 1695a; scale, $m=0.2$ of an inch; and General Chart of Tasmania, No. 1,079; scale, $m=0.11$ of an inch: also Chapter VI.; Winds, page 495, and Currents, page 500.

† See General Chart of Tasmania, No. 1079; scale, $m=0.11$ of an inch; also Chapter VII., and Winds, page 496.

to obtain observations before making the land, it would be desirable to keep more to the southward, passing South of the Mewstone, and on either side of Pedra Blanca and the Eddystone, according to destination, taking care to avoid Sidmouth rock.

From SOUTH of TASMANIA to SYDNEY.—After rounding the South cape, a ship bound to Sydney without touching at Hobart Town, should give a berth of at least 20 or 30 miles to cape Pillar and the East coast of Tasmania, by which she will escape the baffling winds and calms which frequently perplex vessels in shore, while a steady breeze is blowing in the offing. This is more particularly desirable in the summer, when easterly winds prevail, and a current is said to be experienced on the south-east coast at 20 to 60 miles off shore, running to the N. by E. at the rate of three-quarters of a knot, while in shore it is running in the opposite direction, with nearly double that velocity. From a position at about 30 miles eastward of cape Pillar, 350 miles on a North course will take a vessel to 15 miles eastward of Cape Howe, from whence proceed for Sydney as directed at page 503.

ROUTE to the WESTWARD SOUTH of AUSTRALIA.—Ships bound from Sydney to Europe or Hindostan may, from the 1st September to the 1st of April, proceed by the southern route through Bass strait, or round Tasmania, easterly winds being found to prevail along the South coast of Australia at that season, particularly in January, February, and March, when ships have made good passages to the westward, by keeping to the northward of 40° S., and have passed round Cape Leeuwin into the south-east trade wind, which is then found to extend farther South than during the winter months. In adopting this route, advantage must be taken of every favourable change of the wind, in order to make westing; and it is advisable not to approach too near the land, on account of the south-west gales which are often experienced, even in the summer, and the contrary currents, which run strongest in with the land. The prevalence of strong westerly gales renders the southern route very difficult, indeed, generally impracticable, for sailing vessels, in the winter, although the passage has been performed at that season by ships in good condition, which sailed well; but the northern route, through Torres strait, is preferred in the winter months; directions for which are given in Vol. II. of this work.*

* Misapprehension appears to exist on the part of some foreign authorities, in regard to this paragraph, which makes it necessary to remark that it is not intended to recommend ships bound to Europe, to take the western route; for the route by Cape Horn at all seasons and under all circumstances, has always been considered the shortest. But as both ships of war and merchant ships frequently do proceed westward, from Australia to India, to the Cape of Good Hope, and Europe, the Directory would have been manifestly incomplete did it not point out the seasons when such passages could be made with most advantage.

SYDNEY to BASS STRAIT.—A vessel proceeding from Port Jackson to Bass strait, in order to take advantage of the current, should not approach the coast within 15 or 18 miles, and if the distance were even doubled, without losing sight of the land, the current would be found equally strong, and the offing would lessen the danger of a lee shore, should a gale come on to blow from the eastward.*

BASS STRAIT.—PORT PHILLIP and WESTWARD.—From about 30 miles eastward of cape Howe, a vessel bound through Bass strait should not, with southerly winds, steer a more westerly course than S.S.W., until in lat. $39^{\circ} 30'$ S., on account of the danger to be apprehended from south-easterly or southerly gales upon the Long beach between cape Howe and Corner inlet. On reaching the parallel of $39^{\circ} 30'$ S., steer about W. by S., leaving Wright rock about 3 miles to the southward, and the south point of Deal island, the south-easternmost of the Kent group, at the same distance to the northward. Having passed the Kent group, continue the same W. by S. course to about 2 or 3 miles southward of the Sugarloaf rock, leaving the Judgment rocks on the starboard hand.†

From the Sugarloaf to the West Entrance of the Strait.—From the Sugarloaf to cape Wickham, the north end of King island, the course and distance are W. by S. 124 miles, with nothing in the way ; but it is better to steer 15 or 20 miles to the northward of King island, if the winds permit.

Should the wind hang to the westward of North, a course may be safely directed for the north extreme of Three Hummock island, passing afterwards to the northward or southward of King island as the winds may be most favourable, taking care to look out for three small islets said to have been seen by the French corvette *Géographe*, in lat. $39^{\circ} 53'$ S., and nearly 40 miles eastward of the east side of King island ; but which there is every reason to believe do not exist.

BASS STRAIT to the GULF of ST. VINCENT or SPENCER GULF.—From the middle of the West entrance of Bass strait, between cape Otway and King island, the course is W. $\frac{3}{4}$ N. 180 miles to a position about 30 miles south-westward of cape Northumberland, from whence steer N.W. by N. 160 miles to Backstairs passage, and proceed as directed at page 143. If bound to Investigator strait or Spencer gulf, from 30 miles south-westward of cape Northumberland, the course and distance will be

* See Charts of Australia, General Chart, Southern portion, No. 2,759 b. ; scale $d = 1$ inch ; East coast, Sheet 3, Jervis bay to Broken bay, No. 2,143 ; Sheet 2, Barriga point to Jervis bay, No. 2,142 ; and Sheet 1, Cape Howe to Barriga point, No. 2,141 ; scale, $m = 0.26$ of an inch ; also Chapter VIII. ; Winds, page 497, and Currents, page 501.

† See Charts of Bass strait, Nos. 1,695 and 1695a ; scale, $m = 0.2$ of an inch ; also Chapters IV. and V. ; Winds, page 495, and Currents, page 500.

N.W. by W. 200 miles to midway between the alleged position of Mitchie reef and cape Couëdie, the south-west point of Kangaroo island. From thence round the west end of Kangaroo island at such distance as the nature of the wind and other circumstances may render most desirable, and enter Investigator strait or Spencer gulf, as directed at page 134 or 111. In the event of threatening weather from the southward or south-westward, care must be taken to secure a good offing, to avoid what would then be a dangerous lee shore between cape Otway and Encounter bay, and when approaching the south-west part of Kangaroo island a good look-out must be kept, especially for Mitchie reef.*

BASS STRAIT to CAPE LEEUWIN.—A vessel from Bass strait bound round Cape Leeuwin is recommended, with a favorable wind, to shape a course which will lead about 150 miles southward of that cape ; but in winter, when the prevailing winds are from the westward, and veering from N.W. to S.W. or South, the navigator, having then plenty of sea-room, may take advantage of every shift of wind to make the given course to the westward ; and is recommended not to approach the coast of the Great Australian bight with the idea of meeting more favorable winds near the land, which, with southerly or south-westerly gales, would become a most dangerous lee shore.†

The westerly winds, however, are neither so strong or constant near the South coast of Australia in the winter months, as they have been experienced at a great distance from the land.‡ In June a colonial brig arrived at King George sound from Hobart Town in 19 days ; and an open whale-boat, employed sealing along the coast, also in the same month, arrived from the eastward ; in July a small vessel of about 25 tons, also arrived from the eastward. In August, a vessel has reached Swan river from King George sound in 7 days.

The Introduction to this volume having pointed out the route recommended for making the voyage from the Cape of Good Hope to the south coast of Australia ; an outline of the route westward through the Indian ocean to the Cape of Good Hope, and that eastward through the Pacific round Cape Horn, may be found useful in this work.

* See Charts of Australia, South Coast, Sheet 4, L'acepède bay to cape Otway No. 1,062 ; Sheet 3, Australian bight to cape Jervis, No. 1,061 ; scale, $m = 0.08$ of an inch ; Gulfs of St. Vincent and Spencer, No. 2,389 ; scale, $m = 0.13$ of an inch : also Chapters II. and III. ; Winds, page 495, and Currents, page 499.

† See Charts : Australia, South Coast, Sheet 2, cape Arid to Australian bight, No. 1,060 ; and Sheet 1, Cape Leeuwin to cape Arid, No. 1,059 ; scale, $m = 0.08$ of an inch : also Chapter I. ; Winds, page 494, and Currents, page 499. For ports of refuge, page 202.

‡ Captain Middleton.

CAPE LEEUWIN to MAURITIUS and CAPE of GOOD HOPE.—From off cape Leeuwin steer north-westward into the strength of the south-east trade wind, which is generally found between the parallels of 15° and 20° S., and where the equatorial current sets to the westward. Having reached the parallel of 19° or 18° S., in summer, or two or three degrees nearer the equator in winter, continue westward for Mauritius, if bound there, passing 70 or 80 miles south-eastward of Rodrigue isle; but between November and April, at a greater distance, on account of the violent hurricanes which occur at this season. Hurricanes are experienced not only in this locality, but in the space between these islands and the West coast of Australia.*

For the Cape of Good Hope.—A vessel not touching at Mauritius should steer, when South of Rodrigue isle, so as to pass the south-east extreme of Madagascar at a distance of 90 or 100 miles, and continue the same course for the coast of Africa, about Algoa bay. Or she may even make the coast as far north-eastward as Port Natal, to profit by the Agulhas current, to assist her round the Cape of Good Hope.

PORT PHILLIP and SYDNEY to CAPE HORN.—A vessel bound for Europe by way of Cape Horn, on leaving Port Phillip should, with a westerly wind, proceed through Bass strait, and passing a league southward of Kent group, run out about E. by N., and having cleared Wright rock, Endeavour reef, and the Sisters isles, steer for a position between the Snares and Auckland isles, southward of New Zealand, in lat. 49° S., long. 165° E.†

Westward of Tasmania.—If on leaving Port Phillip the wind should be inclined to blow from the East or N.E., it may be desirable to run out south-westward, between cape Otway and King island, and having passed the north end of the island, haul up about S.S.E., taking care while proceeding along the West coast of Tasmania, to prepare for the prevailing westerly or south-westerly winds, when this coast becomes a dangerous lee shore. Having rounded the outlying dangers off the South coast of Tasmania, proceed for the position before mentioned, between the Snares and Auckland isles.‡

* See General Chart of Indian ocean, Cape of Good Hope to Australia, No. 2,483; scale, $d=0\cdot2$ of an inch: also Introduction.

† See General Chart of Australia, Southern portion, No. 2,759b; scale, $d=1$ inch; Charts of Bass Strait, Nos. 1,695 and 1695a; scale $m=0\cdot2$ of an inch; General Chart of New Zealand, No. 1,212; scale, $m=0\cdot04$ of an inch; Chapters IV. and V.; Winds, page 495, and Currents, page 500: also Directions, page 503.

‡ See General Chart of Tasmania, No. 1,079; scale, $m=0\cdot11$ of an inch; also Chapters VI. and VII., and Winds, page 496.

From Sydney.—At all seasons, and from whatever quarter the wind may blow, it is advisable on leaving Port Jackson, to proceed to the southward rather than to the North of New Zealand, as in the latter route a vessel's progress to the eastward would be probably impeded by adverse winds and currents. Advantage therefore should be taken of the most favourable winds for either reaching the before-mentioned position, between the Snares and Auckland islands ; or, if baffled by southerly winds and favoured by fine weather, the passage through Cook strait may be taken with advantage, especially in the spring and summer season.*

From NEW ZEALAND Eastward to CAPE HORN.—The course frequently pursued between the 50th and 60th parallels, and even in higher latitudes in this great extent of ocean, would, with a clear sea and favourable weather, doubtless ensure the quickest passage, as being the shorter distance ; but experience has proved that at nearly all seasons of the year, so much time is lost at night and in thick weather, and even serious danger incurred in avoiding the great quantities of ice met with in these higher latitudes, that a parallel even as far north as 47° has been adopted with advantage.† Between this latter parallel and that of 50° , it is believed the mariner will experience steadier winds, smoother water, absence of ice, and will probably make as short a passage, and certainly one in a more genial climate, and with more security than in a higher latitude.

A vessel pursuing the route suggested above should, from the position southward of the Snares, proceed eastward between the Antipodes and Bounty isles, keeping the parallel recommended to about the meridian of 120° or 115° W., and then gradually incline to the southward, to round Diego Ramirez and Cape Horn in proceeding into the Atlantic Ocean.‡ The seaman in navigating this wide expanse of ocean, and also for rounding Cape Horn, should be provided with the Ice chart published by the Admiralty in 1865, wherein he will find much useful information ; and he is further referred to the foot note in the first paragraph of the Introduction

* See Charts of Australia: East Coast, Sheet 3, Jervis bay to Broken bay, No. 2,143 ; Sheet 2, Barriga point to Jervis bay, No. 2,142 ; and Sheet 1, Cape Howe to Barriga point, No. 2,141 ; scale $m = 0.26$ of an inch ; also Chapter VIII.; Winds, page 497, and Currents, page 501, and Directions, page 506.

† Captain Gill, late commander of the ship *Monarch*, who has made sixteen successful voyages from Australia round Cape Horn, at first adopted the route between the parallels of 52° and 56° S.; but so much time was lost in heaving to at night and in thick weather, to avoid the great quantities of ice he met with, that he has since preferred the parallel of 47° S. for making his casting. He has experienced on this parallel steadier winds, smoother water, and has been less obstructed by ice ; he considers that he has made his passage in less time, and with much more comfort to all on board, than on a more southern parallel.

‡ See General Chart of the Pacific ocean, No. 2,683 ; scale, $d = 0.2$ of an inch.

to this volume descriptive of the tempestuous gales, the heavy and irregular seas, the sudden and fitful shifts of winds occasionally experienced in the high latitudes of the South Indian Ocean, features which appear to be equally common to those of the South Pacific.

BOUNTY ISLANDS.—This little cluster of rocky islets—thirteen in number, and without verdure—cover a space of $3\frac{1}{2}$ miles east and west, by $1\frac{1}{2}$ miles north and south. The western is the largest and may be seen at a distance of 20 miles. At 10 miles South of the eastern island there are 75 fathoms water, fine white sand; and 18 miles E.S.E. of this position, 104 fathoms, fine brimstone coloured sand.

Captain Bligh, R.N., the discoverer in 1788, and from whom the above description is taken, placed the group in lat. $47^{\circ} 44' S.$, long. $179^{\circ} 7' E.$ H.M. Colonial steam sloop *Victoria*, Commander W. H. Norman, visited the Bounty islands in November 1865, and found outlying sunken rocks very dangerous to approach, about $3\frac{1}{2}$ miles off the W.N.W. side. With the group bearing N.N.W. $2\frac{1}{2}$ miles, soundings in 85 fathoms, shells and sand, were obtained; and at 8 miles distant, 95 fathoms, fine sand of brimstone colour. The group on examination, was found to consist of twenty-four small islets from 100 to 300 feet high (with 40 fathoms water half a cable off the north-east side), destitute of vegetation, without landing, and the resort of a great number of penguins and other sea birds. Captain Norman places the group in lat. $47^{\circ} 50' S.$, long. $179^{\circ} 0' E.$

ANTIPODES ISLANDS.—This isolated group consists of several detached rocky islands lying nearly north and south over a space of 4 to 5 miles. The largest island is apparently above 1,000 feet high; the perpendicular cliffs of the whole group varying from 200 to 600 feet, and all the islets appear safe to approach or to pass between. Landing appears impracticable. H. M. Colonial steam sloop *Victoria*, Commander Norman, visited the group in November 1865, and places Antipodes island in lat. $49^{\circ} 42' S.$, long. $178^{\circ} 43' E.$, thus varifying the position by several recent navigators. Experiencing heavy gales from the West and W.N.W., the ship was kept under the lee of the group, and 60 fathoms water found within half a cable of the shore.

It is worthy of remark that between the parallels of $49^{\circ} 50' S.$ and $53^{\circ} 0' S.$, and from the long. of $172^{\circ} 0' E.$ to $162^{\circ} 0' W.$, seaweed has been daily observed.

TABLE OF POSITIONS *

FOR THE

SOUTH COAST OF AUSTRALIA, BASS STRAIT, COASTS OF TASMANIA,
AND EAST COAST OF AUSTRALIA, FROM CAPE HOWE TO
SYDNEY.

Place.	Particular Spot.	Latitude, South.	Longitude, East.	Authorities.
AUSTRALIA, SOUTH COAST.				
Cape Leeuwin -	Highest hill -	34 19 0	115 6 0	Flinders' Chart, No. 1059, and Raper.
Black point -	Extreme -	34 25 0	115 29 0	"
D'Entrecasteaux pt.	Extreme -	34 52 0	116 1 0	"
White-topped rocks -	Western rock -	35 4 0	116 15 0	Wickham and Stokes, adapted to Meridian of Fort Macquarie, in 151° 14'.
Chatham isle -	Centre -	35 2 0	116 28 0	Flinders' Chart, No. 1059, and Raper.
Cape Nuyts -	Extreme -	35 5 0	116 39 0	"
West Cape Howe -	Extreme -	35 9 0	117 40 0	"
Eclipse isles -	Largest isle, summit	35 11 54	117 53 45	Stokes, 1848, and Denham, 1858, adapted to Meridian of Fort Macquarie, in 151° 14'.
Maude reef -	Centre -	35 12 30	117 57 40	"
Bald head -	Extreme -	35 6 54	118 1 36	"
King George sound -	Commissariat house, near Albany jetty.	35 2 20	117 54 0	"
Mount Gardner -	Summit -	35 0 30	118 11 45	"

* The longitudes by Flinders, from Cape Leeuwin to Cape Otway, chiefly result from astronomical observations; but the longitudes from thence, and those by Stokes, Stanley, Yule, and Hutchison, are chronometrically determined, and depend upon Fort Macquarie being considered in 151° 14' E.

The important meridian of Fort Macquarie appears to be yet open to farther investigation. The late Admiral P. P. King, from numerous observations, considered it to be in 151° 15' 25"; the late Captains F. P. Blackwood and Owen Stanley, and Lieutenant C. B. Yule, for their Australian surveys, adopted 151° 14' 50", as reduced from the longitude of Paramatta Observatory, given in the Nautical Almanac; and Captain H. M. Denham, for his observations in the Pacific Ocean, in 1856, employed 151° 14' 40". Captain J. L. Stokes, for the New Zealand Surveys, adopted 151° 15' 30". An analysis of documents in the Hydrographic Office, embracing observations made between the years 1788 and 1851 by numerous navigators and astronomers, places Fort Macquarie in 151° 15' 5" East. Garden island, sometimes used as the place of observation, lies 0° 0' 47" East of Fort Macquarie.

Place.	Particular Spot.	Latitude, South.	Longitude, East.	Authorities.
AUSTRALIA, SOUTH COAST—continued.				
Bald isle - -	Centre - -	34 55 0	116 27 0	Flinders' Chart, No. 1059, and Raper.
Haul-off rock - -	Centre - -	34 43 0	118 40 0	"
Cape Knob - -	Summit - -	34 31 0	119 14 0	"
Hood point - -	Doubtful isles - -	34 24 0	119 34 0	"
East Mount Barren - -	Summit - -	33 57 0	119 59 0	"
Seal isle - -	Centre - -	34 44 0	120 28 0	"
Rocky islets - -	North islet - -	34 5 0	120 53 0	"
Recherche Archipelago.	Termination isle - -	34 30 0	121 58 0	"
"	Twin rocks - -	34 24 0	122 12 0	"
"	West group, south-west point.	34 3 0	121 34 0	"
"	Esperance bay, Observatory isle.	33 56 0	121 46 0	"
"	Cape Le Grand, west point.	34 1 0	122 4 0	"
"	Lucky bay - -	34 0 0	122 14 0	"
"	Mondrain island, summit.	34 10 0	122 14 0	"
"	Draper isle - -	34 14 0	122 30 0	"
"	Twin peaks, south-western.	34 1 0	122 47 0	"
"	Cape Arid, summit	33 58 30	123 10 0	"
"	Middle island, S.W. summit.	34 7 0	123 8 0	"
"	Cape Pasley, summit	33 56 0	123 28 0	"
"	South-east isle, south point.	34 21 0	123 28 0	"
"	Pollock reef, west end.	34 35 0	123 27 0	"
"	Round islet - -	34 5 0	123 49 0	"
"	Eastern group, S.E. islet.	33 51 0	124 4 0	"
Culver point - -	Extreme - -	32 57 0	124 39 0	Flinders' Chart, No. 1060, and Raper.
Dover point - -	Extreme - -	32 34 0	125 30 0	"
Low Sandy point - -	Extreme - -	32 21 0	126 28 0	"
Great Australian bight.	Head - -	31 29 0	131 7 0	"
Nuyts reef - -	Southernmost patch	32 8 0	132 5 0	Flinders' Chart, No. 1061.
Fowler point - -	Extreme - -	33 1 30	132 29 0	Douglas' correction of Chart, No. 1061.
Bell point - -	Extreme - -	32 13 30	133 8 30	"
Nuyts Archipelago -	Isles of St. Francis, summit of largest isle.	32 30 30	133 16 0	"
"	Cannan reef	32 37 30	133 13 30	"
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Place.	Particular Spot.	Latitude, South.	Longitude, East.	Authorities.
AUSTRALIA, SOUTH COAST—continued.				
Nuyts Archipelago -	Hart islet -	32 27 30	133 8 0	Douglas' correction of Chart, No. 1061.
"	Franklin isles, west point.	32 27 15	133 35 30	"
"	St. Peter island, south extreme.	32 19 0	133 31 30	"
"	Brown point, south extreme.	32 32 30	133 48 0	"
"	Cape Bauer, west extreme.	32 43 30	134 1 0	"
"	Westall point -	33 53 30	134 0 0	"
Cape Radstock -	South extreme -	33 11 45	134 15 0	Flinders' Chart, No. 1061.
Investigator group -	Ward Isles, position doubtful.	33 45 0	134 15 0	"
"	Flinders island, S.W. point.	33 46 0	134 24 0	"
"	Pearson isles -	33 56 0 } to 34 2 0 }	134 12 0	"
Drummond point -	West extreme -	34 11 0	135 13 0	"
Sir Isaac point -	North extreme -	34 26 0	135 10 0	"
Greenly isles -	Peak -	34 40 0	134 47 0	"
Beagle islet -	Centre -	34 49 0	134 49 30	Wickham and Stokes, adapted to Mer. of Fort Macquarie, in 151° 14'.
Liguanea isle -	Summit -	34 59 30	135 34 0	Flinders' Chart, No. 2389.
Cape Catastrophe -	West point -	35 1 0	135 54 0	"
Neptune isles -	South-east islet -	35 22 15	136 7 45	Wickham and Stokes, adapted to Mer. of Fort Macquarie, in 151° 14'.
Gambier isles -	South point, Peaked rocks.	35 12 0	136 30 0	Flinders' Chart, No. 2389, and Raper.
Spencer gulf -	Dangerous reef, centre.	34 48 0	136 11 0	"
"	Cape Donnington -	34 44 0	135 57 0	"
"	Port Lincoln, Boston isle, centre.	34 43 0	135 53 0	"
"	Bolingbroke point -	34 39 0	136 4 0	"
"	Sir Joseph Banks group, Stickney inlet.	34 41 0	136 14 0	"
"	Lipson cove, islet close off it.	34 16 0	136 14 0	"
"	Cape Burr -	34 8 0	136 18 0	"
"	Cape Driver -	33 54 30	136 32 0	"
"	Franklin harbour, entrance.	33 44 0	136 53 0	"

TABLE OF POSITIONS.

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Place.	Particular Spot.	Latitude, South.	Longitude, East.	Authorities.
AUSTRALIA, SOUTH COAST—continued.				
Spencer gulf	Plank point	33 26 0	137 24 0	Hutchinson, assuming Glenelg flag-staff, Adelaide, in 136° 32' 42", adapted to Meridian of Port Macquarie, in 151° 14'.
"	Mount Laura	33 0 0	137 34 0	"
"	Cape Spencer, south point.	35 16 21	136 54 33	"
"	Corney point	34 54 3	137 2 33	"
"	Port Victoria, west side	34 28 25	137 24 24	"
"	Cape Elizabeth	34 8 30	137 28 50	"
"	Tipara light-vessel	34 3 55	137 25 30	"
"	Point Riley	33 52 49	137 37 54	"
"	Point Webbing	33 35 0	137 54 0	"
"	Barn hill	33 34 45	138 9 0	"
"	Point Jarrold	33 15 30	137 50 0	"
"	Mount Ferguson, Germein bay.	33 6 30	138 3 30	"
"	Bluff	33 6 0	138 11 0	"
"	Wards point	33 1 0	137 59 0	"
"	Point Lowly	33 0 0	137 49 0	"
"	Backys point	32 55 0	137 49 0	"
"	Douglas point	32 51 30	137 50 0	"
"	Mount Remarkable	32 48 30	138 11 30	"
"	Two Hummock point	32 45 0	137 50 30	"
"	Paterson point	32 36 30	137 50 0	"
"	Augusta flag-staff	32 29 42	137 47 23	"
Investigator strait	Cape Borda light-house.	35 45 40	136 38 50	Flinders' Chart, No. 2389.
"	Althorp isles, largest isle, south point	35 23 8	136 53 9	Hutchinson.
"	Sandy point	35 10 0	137 25 0	Flinders' Chart, No. 2389.
"	Troubridge hill	35 11 0	137 41 0	"
"	Troubridge light	35 7 50	137 52 0	"
"	Cape Dutton	35 37 30	137 14 0	"
"	Point Marsden	35 34 0	137 44 0	"
Kangaroo island	Cape Bedout	35 56 0	136 37 0	"
"	Cape Couëdie	36 5 0	136 47 0	"
"	Lipson reef	36 9 30	137 53 0	Douglas, 1859.
"	Mount Bloomfield	35 58 0	137 19 0	Flinders' Chart, No. 2389.
"	Cape Gantheaume	36 4 0	137 33 0	Douglas, 1859.
"	Cape Willoughby light-house.	35 51 33	138 10 50	"
Mitchie reef	Position doubtful	36 33 0	136 32 0	"
Young rocks	Highest rock	36 30 30	137 23 0	"

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Place.	Particular Spot.	Latitude, South.	Longitude, East.	Authorities.
AUSTRALIA, SOUTH COAST—continued.				
Pelorus rock -	Centre -	36 6 0	137 36 0	Douglas, 1858.
Gulf of St. Vincent -	Cape Jervis, extreme	35 39 0	138 9 0	Flinders' Chart, No. 2389.
"	Port Willunga, Snapper point.	35 18 0	138 30 0	"
"	Glenelg flag-staff -	34 53 33	138 32 42	Plan, No. 1732, adapted to Me- ridian of Fort Macquarie in 151° 14'.
"	Mount Lofty -	34 58 30	138 44 24	"
"	Port Adelaide, light-vessel.	34 47 48	138 29 20	"
"	Mount Barbara -	34 23 0	137 53 0	Flinders' Chart, No. 2389.
"	Port Wakefield, Sandy point.	34 13 0	138 12 30	"
Rosetta head -	Extreme -	35 35 30	138 40 30	"
Murray river -	Sea mouth. Barker knoll.	35 34 0	138 57 30	Douglas, 1857.
Cape Morard -	Extreme -	36 34 0	139 51 30	Flinders' Chart, No. 1062.
Lacépède bay -	Maria Creek -	36 45 0	139 53 0	"
Cape Bernoulli -	Extreme -	36 55 0	139 40 0	"
Cape Dombey -	Extreme -	37 10 11	139 44 11	"
Cape Jaffa -	West extreme -	37 29 30	140 4 0	"
Cape Buffon -	North extreme -	37 35 0	140 11 0	"
Cape Banks -	Extreme -	37 53 0	140 23 0	"
Mount Gambier -	Summit -	37 51 30	140 42 0	"
Cape Northumber- land.	Light-house -	38 2 45	140 37 45	"
Ruby rock -	" -	38 6 0	140 52 30	"
Glenelg river -	Entrance -	38 3 0	141 0 0	"
Cape Bridgewater -	South extreme -	38 11 0	141 24 0	"
Cape Nelson -	South extreme -	38 20 0	141 33 0	"
Portland bay -	Light-house on Observatory hill.	38 21 40	141 38 0	"
Percy isle -	Centre -	38 26 0	142 1 0	"
Port Fairy -	Light-house -	38 23 47	142 19 12	Plan, No. 2506.
Lady bay -	Light-house -	38 25 39	142 31 11	Plan, No. 2494.
Curdie inlet -	Entrance -	38 37 0	142 53 0	Flinders' Chart, No. 1062.
Cape Otway* -	Light-house -	38 51 45	143 31 10	Chart, No. 1695a.
Port Phillip -	Melbourne Observatory.	37 49 53	144 53 42	Government Astronomer.†

* The longitude of Cape Otway and of every position from thence to Sydney is adapted to the meridian of Fort Macquarie, in 51° 14' E.

† The longitude of Melbourne Observatory, communicated by the Government Astronomer is nearly identical with the mean of the longitudes by Stokes, Stanley, and Yule,

Place.	Particular Spot.	Latitude, South.	Longitude, East.	Authorities.
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AUSTRALIA, SOUTH COAST—continued.

Port Phillip	-	Point Lonsdale light-house.	38 17 40	144 36 58	Government Astronomer.
"	-	Shortland Bluff, high light-house.	39 16 26.7	144 39 46.17	"
"	-	Arthur's Seat	38 21 20	144 57 10	"
"	-	Schnapper light	38 12 50	145 2 10	"
"	-	Point Gellibrand, site of old light- house.	37 52 10	144 54 55	"
"	-	West Channel light-vessel.	38 11 50	144 45 30	"
"	-	Prince George bank, north spit.	38 6 30	144 44 0	"
"	-	Point Henry bluff	38 7 53	144 25 40	"
"	-	Geelong light-vessel	38 5 50	144 26 0	"
"	-	Point Wilson	38 5 36	144 30 35	"
"	-	Station peak	37 57 12	144 25 40	"
Cape Schanck	-	Light-house	■ 29 42	144 53 10	Chart, No. 1695a.
Port Western { West head	-	Extreme	38 29 15	145 1 55	Chart, No. 1707.
Grant point	-	West extreme	38 31 15	145 7 0	"
Quoin hill	-	Summit	38 30 12	145 11 0	"
Pyramid rock	-	Summit	38 32 3	145 13 18	"
Cape Wollamai	-	South extreme	38 34 15	145 21 21	"
Cape Paterson	-	South extreme	38 41 0	145 36 20	Chart, No. 1695a.
Cape Liptrap	-	Extreme	38 55 0	145 56 0	"
Glennie islands	-	Largest, centre	39 5 10	146 15 0	Chart, No. 1695.
Wilson promontory	-	Light-house on S.E. extreme.	39 8 0	146 27 0	"
Mount Wilson	-	Summit	■ 3 30	146 25 40	" and Chart, No. 1073.
Waterloo bay	-	South-west point	39 5 35	146 23 0	"
Cape Wellington	-	South point	39 4 20	146 30 18	"
Rabbit isle	-	South-east part	39 55 0	146 32 0	"
Cliffy islet	-	Centre	38 57 15	146 42 50	"
Mount Hunter	-	Summit	38 49 35	146 23 30	"
Corner inlet	-	Entrance	38 47 0	146 30 30	"
Latrobe island	-	South extreme, Townsend point.	38 47 30	146 54 15	"

as chronometrically measured from Fort Macquarie, considered in $151^{\circ} 14'$. The longitude by Stokes being $144^{\circ} 59' 16''$; by Stanley's two meridian distances with *Rattlemake's* 15 chronometers $144^{\circ} 58'$; by Yule's two measurements, with *Bramble's* ten chronometers $144^{\circ} 58' 45''$. The mean longitude of Melbourne Observatory being $144^{\circ} 58' 41''$.

Place.	Particular Spot.	Latitude, South.	Longitude, East.	Authorities.
AUSTRALIA, SOUTH COAST—continued.				
Latrobe island	East point light-house.	38 45 0	146 40 35	Charts, Nos. 1695 and 1073.
Shallow inlet	Bar	38 46 20	146 42 30	"
Lake Tyers	Entrance	37 50 0	148 5 0	Genl. Cht. of Australia, No. 27598.
Cape Everard	Extreme	37 47 0	149 17 30	"
Ridge End	Extreme point	37 45 10	149 29 20	Chart No. 2141.
Ram head	South-west extreme	37 42 30	149 38 15	"
Gabo isle	Light-house	37 34 40	149 55 0	"
BASS STRAIT.				
King island	Cape Wickham light-house.	39 35 20	148 57 10	Chart, No. 1695a.
"	Franklin road	39 40 0	148 51 30	"
"	Fitzmaurice bay	40 2 30	148 53 0	"
"	Stokes point	40 9 30	148 55 40	"
Reid rocks	Rock above water	40 14 30	144 10 0	"
Bell rock	Centre	40 28 20	144 5 20	"
Black pyramid	Summit	40 28 10	144 21 10	"
Rodondo isle	Summit	39 14 15	146 24 40	Chart, No. 1695.
Curtis isle	S.W. summit	39 28 30	146 40 0	"
Sugarloaf rock	Summit	39 31 20	146 40 40	"
Devil tower	Summit	39 22 40	146 46 15	"
Hogan group	Largest isle, centre.	39 13 30	147 1 0	"
Judgment rocks	S.W. isle	39 31 20	147 9 30	"
Kent group	Deal island, light-house.	39 29 45	147 21 0	"
Wright rock	Centre	39 35 10	147 34 0	"
Endeavour reef	North-west extreme	39 36 30	147 36 30	"
Craggy islet	Centre	39 40 45	147 42 10	"
Sisters isles	North-eastern isle, centre.	39 38 30	148 0 45	"
Flinders island	Cape Frankland, west point.	39 51 50	147 46 0	"
"	Babel isles, south-east islet.	39 57 0	148 23 35	"
"	Strzelecki peaks, south-east peak.	40 11 45	148 6 0	"
Hummock isle	Low isles off south point.	40 7 15	147 44 30	"
Goose isle	Light-house on southern end.	40 18 5	147 48 0	and Chart No. 1700.
Barren island	Mount Munro	40 21 45	148 8 20	"
"	Cape Sir John	40 24 50	148 0 40	"
"	Cape Barren, islet off it.	40 25 45	148 21 0	"
"	Passage isle, south point.	40 31 0	148 22 0	"

Place.	Particular Spot.	Latitude, South.	Longitude, East.	Authorities.
BASS STRAIT—continued.				
Clarke island -	Look-out rocks -	40 33 0	148 7 15	Chart, Nos. 1695 and 1706.
"	South point -	40 35 30	148 12 0	"
"	Moriarty bank, east extreme	40 35 30	148 19 0	"
Banks strait -	Swan isle, light-house	40 43 30	148 8 30	"

TASMANIA, NORTH COAST.

Cape Portland	North-west point -	40 44 0	147 57 40	Chart, No. 1695.
Waterhouse isle	North point -	40 45 11	147 39 50	
Ninth islet -	Centre -	40 49 40	147 17 30	
Stony head -	North point -	40 58 45	147 2 30	
Tenth islet -	Centre -	40 56 45	147 0 30	
Port Dalrymple	Low head, light-house	41 8 14	146 48 38	Chart, No. 1079. Chart, No. 1695a.
Badger point	Extreme -	41 5 30	146 40 40	
Port Sorrell -	North-west entrance head	41 7 5	146 33 30	
Port Frederick	Entrance -	41 10 0	146 24 30	
Port Fenton -	Entrance -	41 9 30	146 17 15	
Leven river -	West entrance head	41 8 30	146 12 0	Chart, No. 1079. Chart, No. 1695a.
Dial range -	North summit -	41 9 30	146 7 0	
Cradle mountain	Summit -	41 42 0	145 58 30	
Round hill -	Summit -	41 4 40	145 59 30	
Emu bay -	Blackman point -	41 2 50	145 57 0	
Table cape -	Summit -	40 56 40	145 45 40	"
Rocky head -	North point -	41 51 0	145 32 0	
Sawyers bay -	Mouth of Black river	40 50 10	145 20 30	
Circular head -	Summit -	40 45 15	145 19 26	
North point -	Extreme -	40 42 30	145 17 0	
Robbins island	Guyton point -	40 40 10	145 3 40	"
Petrel islets	Northernmost islet	40 33 10	144 57 0	
Tomatin bank	Centre -	40 32 0	145 3 0	
Three Hummock island	North point, Mermaid rock	40 22 50	144 57 15	
Hunter island	North point -	40 23 40	144 47 45	
Albatross islet	North point -	40 23 0	144 39 40	"
South Black rock	Centre -	40 33 30	144 36 30	
Trefoil isle -	Centre -	40 37 40	144 41 40	

TASMANIA, WEST COAST.

Cape Grim	Outer Doughboy islet	40 40 10	144 46 40	"
Boat harbour	Green point -	40 54 35	144 40 0	"
West point -	Extreme -	40 57 0	144 38 0	"
Arthur river	Entrance -	41 4 0	144 44 0	"

Place.	Particular Spot.	Latitude, South.	Longitude, East.	Authorities.
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TASMANIA, WEST COAST—continued.

Southern Boat har- bour	Entrance - -	41 11 0	144 43 30	Chart, No. 1693a.
Ordnance point	Rocks close off it -	41 15 30	144 40 0	Chart, No. 1079.
Nandy cape	Extreme - -	41 26 0	144 44 0	"
Picman river	Rocks close off the entrance	41 41 0	144 57 0	"
Two conical rocks	Outer rock - -	41 43 0	144 57 0	"
Mount Heemskerk	Summit - -	41 51 30	145 9 0	"
Eldon range	Summit - -	41 59 0	145 45 0	"
Cape Sorell	North-west extreme	42 11 30	145 10 0	"
Macquarie harbour	Entrance islet -	42 12 0	145 13 30	"
Sloop rock	Centre - -	42 21 0	145 9 0	"
Frenchman Cap	Summit - -	42 16 0	145 53 0	"
Hibbs point	Extreme - -	42 38 0	145 15 0	"
Black rock	Summit - -	42 54 0	145 25 0	"
Junction range	Summit - -	42 52 0	145 33 0	"
Rocky point	Extreme - -	43 0 0	145 30 0	"
De Witt range	Summit - -	43 10 0	145 50 0	"
Port Davey	Pollard, or North head.	43 19 0	145 53 0	"
"	Pyramidal rock near south-east point of the entrance.	43 21 30	145 55 30	"
Berry head	Summit - -	43 18 0	146 3 0	"
Arthur range	Summit - -	43 9 0	146 18 0	"
South-west cape	Extreme point -	43 33 30	146 2 0	"

TASMANIA, SOUTH COAST.

Cox bight	Entrance - -	43 30 0	146 14 0	"
Louisa bay	Islet in the entrance	43 31 30	146 21 0	"
Bathurst range	Summit - -	43 27 0	146 15 30	"
High bluff	Extreme - -	43 33 0	146 25 0	"
Mantsuyker isles	South-west extreme, Needle rock.	43 39 40	146 16 30	"
Mewstone	Centre - -	43 44 30	146 23 0	"
Ile Du Golfo	Centre - -	43 34 30	146 31 30	"
Fluted point	South extreme -	43 38 0	146 44 0	"
La Perouse	Summit - -	43 30 0	146 46 0	"
South Cape bay	Entrance - -	43 38 0	146 48 0	"
South cape	Three Hillock point	43 39 15	146 51 30	"
Pedra Blanca	Centre - -	43 51 30	146 59 30	"
Eddystone	Summit - -	43 51 0	147 2 0	"
Sidmouth rock	Centre - -	43 47 30	147 7 0	"
D'Entrecasteaux channel.	Recherche bay, Ar- thur point.	43 31 30	146 6 45	"
"	Acmon reefs, South Break.	43 35 0	147 0 45	"

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Place.	Particular Spot.	Latitude, South.	Longitude, East.	Authorities.
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TASMANIA, SOUTH COAST—continued.

D'Entrecasteaux channel.	Cape Bruny, light-house.	43 29 40	147 9 45	Chart, No. 1079.
" "	Southern entrance -	43 32 0	147 6 0	"
Bruny island -	Tasman head, extreme	43 31 0	147 19 15	"
" -	Friar rocks, S.E. patch	43 32 40	147 20 0	"
" -	Fluted cape	43 22 0	147 24 30	"
" -	Adventure bay, Penguin islet.	43 21 0	147 23 40	"
" -	Cape Frederick Henry	43 15 30	147 27 0	"
" -	Trumpeter bay, centre	43 10 0	147 25 0	"
" -	Cape Delasorte, Kelly point.	43 4 0	147 22 0	"
Mount Louis -	Summit -	43 3 15	147 21 0	"
Iron Pot islet -	Light-house -	43 3 45	147 26 0	"
Derwent river -	Entrance -	43 3 45	147 24 30	"
Hobart town -	Fort Mulgrave -	42 53 32	147 21 20	and Stokes.
Betsy rocks -	Southernmost -	43 4 30	147 30 30	Chart, No. 1079.
North, or Frederick Henry bay.	Middle of entrance	42 59 0	147 36 0	"
Mt. Communication	Summit -	43 3 0	147 40 30	"
Quoin bay -	Quoin islet -	43 8 0	147 42 0	"
Cape Raoul -	South-east point -	43 14 30	147 50 0	"
Port Arthur -	Entrance -	43 11 30	147 55 0	"
Cape Pillar -	Tasman isle, close off it.	43 14 0	148 2 0	"

TASMANIA, EAST COAST.

Hippolite rock -	Summit -	43 7 45	148 4 0	"
Mongo bay -	Entrance -	43 1 0	147 58 0	"
Macgregor peak -	Summit -	42 59 0	147 58 0	"
Cape Frederik Hendrik.	Extreme -	42 52 0	148 0 0	"
Cape Bernier -	Extreme -	42 43 30	147 57 30	"
Maria island -	Cape Peron -	42 44 30	148 2 0	"
" -	Riedé, bay -	42 40 0	148 7 0	"
" -	Mount Maria -	42 37 0	148 7 30	"
Isle Des Phoques	Centre -	42 26 0	148 10 30	"
Oyster bay -	Middle of entrance	42 20 0	148 9 0	"
Schouten island -	Tailfer islets, southernmost.	42 22 0	148 20 0	"
Freycinet peninsula	Summit -	42 13 0	148 19 0	"
Cape Lodi -	Extreme -	41 55 0	148 20 0	"
Mount St. John -	Summit -	41 47 0	148 6 0	"
Long point -	North extreme -	41 44 0	148 19 0	"
St. Patrick head -	North point -	41 34 0	148 19 30	"

Place.	Particular Spot.	Latitude, South.	Longitude, East.	Authorities.
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TASMANIA, EAST COAST—continued.

Huntsman Cap	- Summit	- 41 31 0	148 7 0	Chart, No. 1079.
St. Helens point	- Bare Top hill	- 41 17 0	148 21 30	"
George bay	- Entrance bar	- 41 16 30	148 20 45	"
Mount Pearson	- Summit	- 41 14 30	148 15 0	"
Eddystone point	- Extreme	- 40 59 0	148 21 50	Chart, No. 1695.
Mount William	- Summit	- 40 54 30	148 12 0	"

AUSTRALIA, EAST COAST.

Cape Howe	- Extreme	- 37 30 15	149 59 0	Chart, No. 2141.
Howe hill	- Summit	- 37 31 0	149 53 0	"
Green cape	- South-east point	- 37 15 45	150 3 30	"
Twofold bay	- Red point	- 37 6 0	149 57 45	"
"	- Look-out point light-house.	37 4 30	149 55 30	"
"	- Worang point, New- stone.	37 3 30	149 57 30	"
Mount Inlay	- Summit	- 37 10 50	149 44 30	"
Pambula river	- Entrance	- 36 57 0	149 55 30	"
Tura head	- Extreme	- 36 51 45	149 57 30	"
Taringal point	- Islet close off it	- 36 47 45	149 59 0	"
Tathra head	- North-east extreme	36 44 0	150 0 0	"
Mogareka inlet	- Entrance	- 36 42 30	149 59 0	"
Bunga head	- Extreme	- 36 35 15	150 4 0	"
Thubba inlet	- Entrance	- 36 32 0	150 3 30	"
Mount Townsend	- Summit	- 36 32 30	149 52 30	"
Barriga point	- East extreme	- 36 31 0	150 4 0	Chart, No. 2142.
Burmaghon inlet	- Entrance	- 36 25 30	150 4 30	"
Mount Dromedary	- Summit	- 36 18 45	150 2 0	"
Cape Dromedary	- Extreme	- 36 18 15	150 8 45	"
Montagu isle	- South point	- 36 16 0	150 14 0	"
Wagonga inlet	- Entrance	- 36 12 30	150 8 30	"
Boogon inlet	- Entrance	- 36 4 15	150 8 30	"
Bingy point	- Extreme	- 36 0 15	150 10 30	"
Torogy point	- North extreme	- 35 55 0	150 10 15	"
Broulee head	- South-east point	- 35 52 0	150 12 0	"
Burrewerre point	- Extreme	- 35 50 30	150 15 0	"
Bateman bay	- Tollgate isles, summit of South- western isle.	35 45 30	150 16 30	"
Mount Oldrey	- Summit	- 35 40 0	150 2 0	"
Point Upright	- Grasshopper islet	- 35 38 15	150 21 0	"
Dawson islets	- Outer islet	- 35 35 40	150 23 0	"
O'Hara point	- East extreme	- 35 34 0	150 24 0	"
Brush isle	- Centre	- 35 32 0	150 26 0	"
Crampton islet	- Centre	- 35 27 0	150 25 45	"
Cook's Pigeon House	- Summit	- 35 21 15	150 17 0	"

Place.	Particular Spot.	Latitude, South.	Longitude. East.	Authorities.
AUSTRALIA, EAST COAST—continued.				
Ulladulla harbour -	North entrance head	35 21 30	150 30 20	Chart, No. 2142.
Green islet - -	Centre - -	35 16 45	150 32 15	"
Red head - -	Extreme - -	35 15 30	150 34 0	"
Sussex inlet - -	Entrance - -	35 12 15	150 37 0	"
St. George head -	South point -	35 12 30	150 43 15	"
Cape St. George -	East point -	35 11 15	150 46 45	"
Jervis Bay light-house	North 2 miles from Cape St. George.	35 9 30	150 47 0	"
Jervis bay - -	Bowen isle, north point.	35 6 45	150 47 30	"
" - -	Perpendicular point	35 5 45	150 50 0	"
Crocodile head -	East extreme -	35 3 45	150 52 0	"
Beecroft point -	North extreme -	35 0 30	150 52 0	"
Crookhaven - -	Centre - -	35 0 30	150 50 0	Chart, No. 2143.
Shoalhaven rivers -	Southern river, entrance.	34 53 45	150 47 0	"
" - -	Northern river, entrance.	34 51 30	150 46 0	"
Black point - -	Extreme - -	34 47 0	150 51 0	"
Geering bay - -	Centre - -	34 44 0	150 51 30	"
Flinders ridge -	Nipple, summit -	34 43 0	150 45 30	"
Kiama harbour -	South head, outer extreme.	34 39 30	150 53 30	"
Bass point - -	Extreme - -	34 35 20	150 55 45	"
Red Point islets -	Outermost islet -	34 29 30	150 58 0	"
Wollongong head -	Summit - -	34 25 15	150 56 10	"
Bellambi Great reef	Centre - -	34 22 30	150 57 45	"
Bellambi bay - -	Centre - -	34 22 0	150 57 0	and E. O. Moriarty.
Coal cliff - -	- - - -	34 15 30	151 0 0	Chart, No. 2143.
Stanfield bay - -	- - - -	34 14 30	151 0 30	"
Boat harbour - -	East point of entrance.	34 9 30	151 8 0	"
Hacking head - -	North point -	34 4 45	151 11 0	"
Cape Banks - -	Extreme - -	34 0 0	151 15 55	"
Port Jackson - -	South Head light-house	33 51 28	151 18 14	"
" - -	Fort Macquarie -	33 51 42	151 14 0	Various, and a- dopted at Hydro- graphic Office.

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LONDON:
Printed by GEORGE E. EYRE and WILLIAM SPOTTISWODE,
Printers to the Queen's most Excellent Majesty.
For Her Majesty's Stationery Office.
[326.—500.—4/68.]
[P. 104.—500.—4/68.]

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